Volume 1, Issue 2

SERIOUS 3D

Serious Tutorials for Serious 3D Artists

Photorealistic Creature Design Part 2

The Secrets of Photorealisitc Surfacing Part 2

ATTACK OF THE LIVING TOONS!

US $7.95 Canada $10.75

02>

0 74470 91698 7

Please place with computer magazines

A Serious Publishing Group, Inc. Publication

www.serious3d.com

www.zygote.com

Fantasy becomes reality with Zygote 3D Models

This image was created using Zygote's 3D models!

We've created various 3D model collections to meet your needs.

Why wait? Our collections will help you save time and money!

New Zygote products:

24 Zygote people* (LE) 99.95

24 Zygote people* (full) 299.95

*Follow up to the award winning 18 perfect people

Collection contains 24 new figures of different nationalities, body types and ages.

Blowout Specials:

Mix and match ~~495.95~~ 345.95

Sampler 1&2 ~~199.90~~ 89.95

Stuff for Poser™ 3

People (14 figures) 149.95
Animals (12 animals) 149.95
Motion (50 motions) 99.95
Accessories (100 props) 34.95
Sampler (figures, motions, props) 19.95

Purchase all collections get $75.00 off!

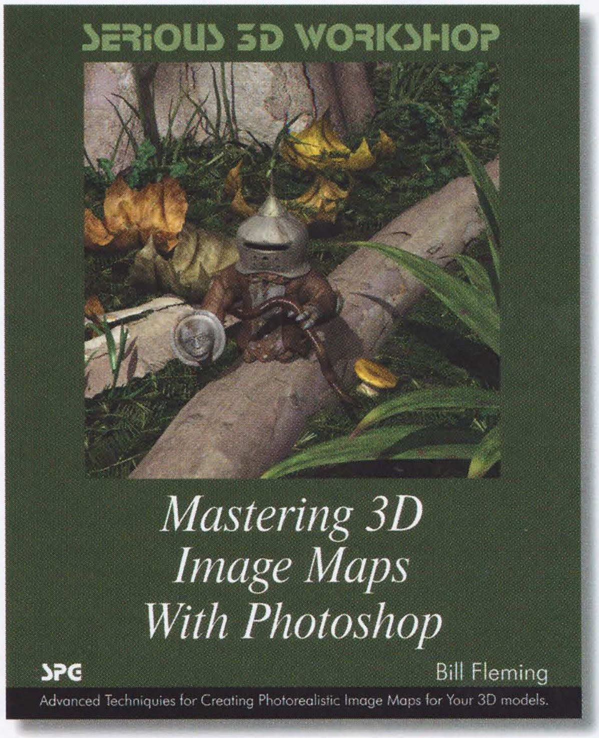
POSER™ 3

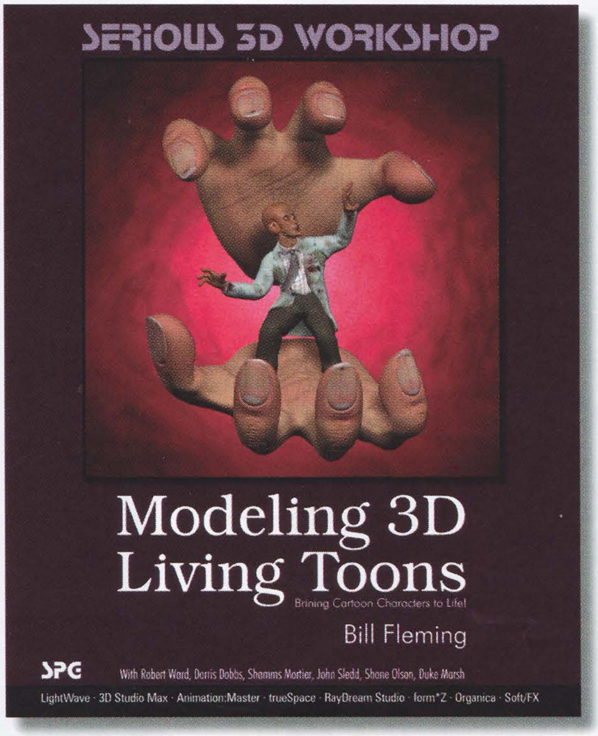
ZYGOTE™ MEDIA GROUP

1-888-3dmodel or 1-801-375-0553 • Fax 1-801-375-7389 • One East Center St.#215 Provo, UT 84606

Pre-Publication Special!

Get Both of These Awesome 3D Books for Only $49.95 Before Jan. 15, 1999!


SERIOUS 3D WORKSHOP
Mastering 3D Image Maps With Photoshop
SPG
Bill Fleming
Advanced Techniques for Creating Photorealistic Image Maps for Your 3D models.


SERIOUS 3D WORKSHOP
Modeling 3D Living Toons
Brining Cartoon Characters to Life!
Bill Fleming
SPG
With Robert Ward, Darris Dobbs, Shamms Mortier, John Sledd, Shane Olson, Duke Marsh
LightWave · 3D Studio Max · Animation:Master · trueSpace · RayDream Studio · form*Z · Organica · Soft/FX

Normally priced at $70.00 (34.95 each), this limited time offer will give you the power to blow minds with killer 3D characters and eye-popping photorealistic surfaces, for a mere $49.95! All the power you need is just a phone call or mouse click away!

800-353-0100 US Customers Only
805-940-3133 All Other Countries

www.serious3d.com

Go Directly to http://www.serious3d.com/the_store/order.html

Table of Contents

SERIOUS 3D
Volume 1, Issue 2

Editors' Desk
Ramblings from the Editor in Chief 4

Creature Design Part Two:
The Surfacing
by Bill Fleming 6

Surfacing Secrets
Part Two
by Bill Fleming 10

Feature Artist:
Victor Garrido 15

LightWave:
Modeling a Living Toon
by Bill Fleming 16

3D Studio Max:
Living Toon Modeling
by Shane Olson 26

Serious 3D Contributors
34

Creating Cool Characters
by Bill Fleming 36

Organica:
3D Toons with Impulse's Organica 1.0
by R. Shamms Mortier 42

Animation Master:
Modeling a Grumpy Old Man
by Robert Ward 51

trueSpace:
Modeling a Living Toon with trueSpace
by Darris Dobs 57

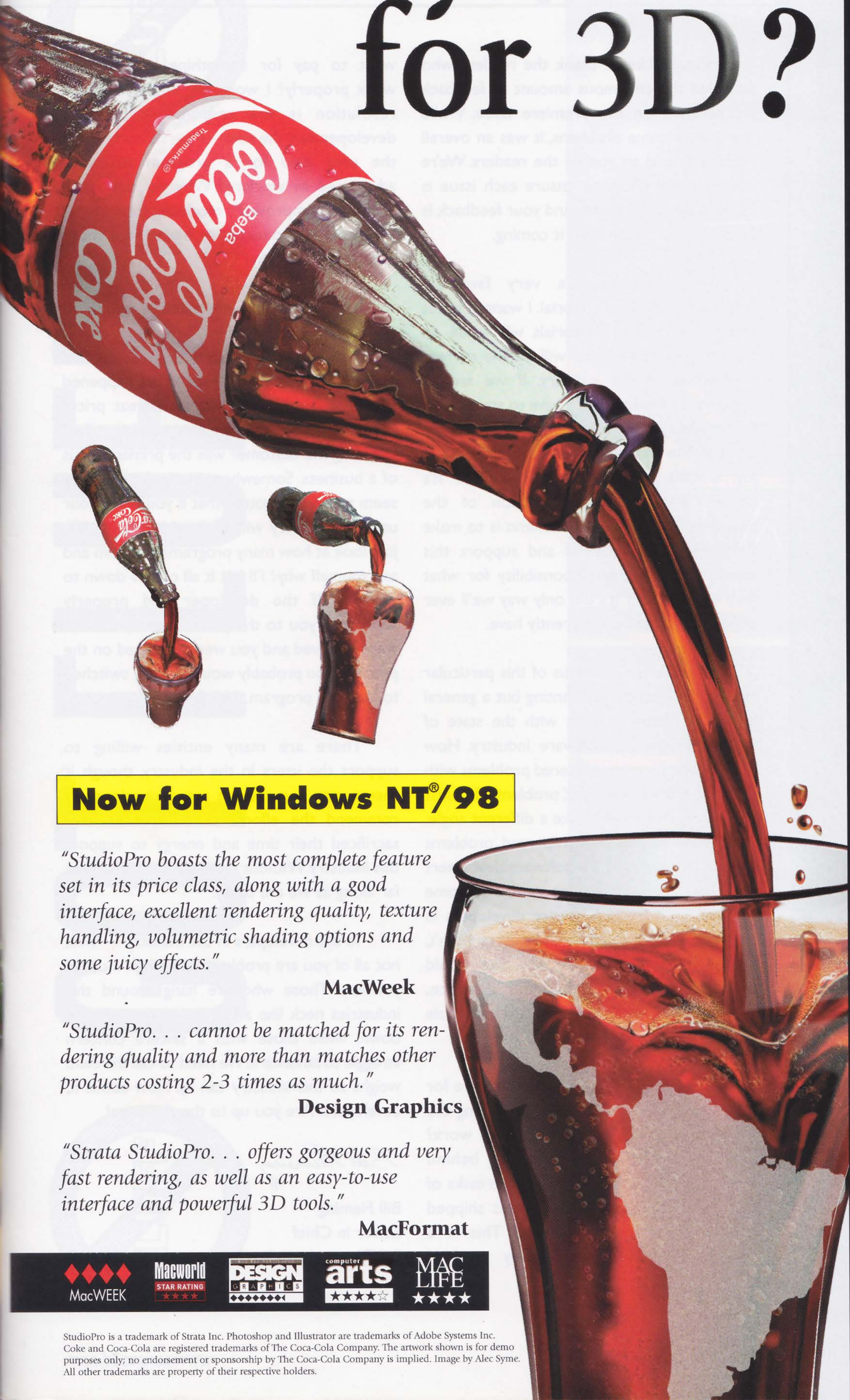
PhotoShop:
Surfacing a Living Toon
by Bill Fleming 67

Ray Dream Studio:
Creating A Living Toon
in Ray Dream Studio
by John Sledd 77

Serious 3D News:
by R Shamms Mortier 84

www.anibyte.com

Thirsty for 3D?



Now for Windows NT®/98

"StudioPro boasts the most complete feature set in its price class, along with a good interface, excellent rendering quality, texture handling, volumetric shading options and some juicy effects."

MacWeek

"StudioPro. . . cannot be matched for its rendering quality and more than matches other products costing 2-3 times as much."

Design Graphics

"Strata StudioPro. . . offers gorgeous and very fast rendering, as well as an easy-to-use interface and powerful 3D tools."

MacFormat

♦♦♦♦ MacWEEK · Macworld STAR RATING ★★★★ · DESIGN GRAPHICS ♦♦♦♦♦♦♦◊ · computer arts ★★★★☆ · MAC LIFE ★★★★

StudioPro is a trademark of Strata Inc. Photoshop and Illustrator are trademarks of Adobe Systems Inc. Coke and Coca-Cola are registered trademarks of The Coca-Cola Company. The artwork shown is for demo purposes only; no endorsement or sponsorship by The Coca-Cola Company is implied. Image by Alec Syme. All other trademarks are property of their respective holders.

STRATA™ STUDIO *Pro* *version 2.5*

STRATA
STUDIO Pro
STRATA

Quench It! With StudioPro.

"Coming from a 2D background as an airbrush illustrator, I started creating digital illustrations using Adobe Photoshop™ and Adobe Illustrator™. After seeing 'Myst', I HAD to have **StudioPro**. I am consistently impressed with its **power** and **ease of use**. The interface has a familiar feel with all of the tools at your fingertips. If you are familiar with Photoshop and Illustrator, then you already know the basics of StudioPro.

"Creating models in StudioPro is extremely easy, especially with robust features like **bezier spline modeling**, **path extrude**, and **deformation lattice.** I also have precise control of my models with **user-definable grids**. The **mirror** tool saves precious time by mirroring the geometry and textures with just a click!

"The texturing capabilities of StudioPro are unmatched by any other 3D program. Providing characteristics such as **reflection**, **refraction**, **bump** and **caustics** to name a few. Add **volumetrics** like mist or fog, **depth of field**, and **motion blur** to achieve true realism. **Unlimited cameras** and **lights** allow me to instantly adjust my scene - one of the beauties of creating with 3D. StudioPro's rendering is the benchmark, with a lightning-fast **ray-tracer** that produces beautiful work.

"My clients demand the highest quality, short turn-arounds, and flexibility. That's exactly what StudioPro gives me."

Alec Syme/Stewart Artists
www.alecsyme.com

This is just a taste of the powerful features that StudioPro has to offer! **Power Module 1** is a powerful collection of plug-ins and comes **FREE** with StudioPro!

For more information about the new **StudioPro**, visit our website at http://www.strata3d.com. To order call **1-800-STRATA3D** or visit http://store.strata3d.com.

Power Macintosh • Windows NT®/98

STRATA

Powering the Creative Environment™

SERIOUS 3D
Serious Tutorials for Serious 3D Artists
Volume 1, Issue 2

Editor in Chief:
Bill Fleming
bill@komodostudio.com

Animation Technical Editor:
Justin Knowles

Contributing Editors:
Darris Dobbs
R. Shamms Mortier
Shane Olson
John Sledd
Robert Ward

Marketing Director:
Steve McKay

Magazine Design / Production:
Rusty Dickson

For subscription orders only:
Phone: 800-353-0100
International: 805-940-3133
Fax: 619-458-3695

For advertising inquiries only:
R. Shamms Mortier
Phone: 802-453-4062
email: ads@serious3d.com

Send all correspondence, queries, or requests to:
Serious 3D Magazine
7770 Regents Road Suite 113-513
San Diego, CA 92122

Attention Retailers:
To carry Serious 3D Magazine in your store, contact **International Periodicals Distributors** at:
800-999-1170 X 447
(dealer calls only)

© 1998 Serious Publishing Group, Inc. All rights reserved. Reproduction in whole or in part is prohibited without written consent from the Publisher.
Serious 3D™ is a trademark of Serious Publishing Group, Inc.

Editor's Desk

Rantings From the Editor in Chief

First, I'd like to thank the readers who provided the enormous amount of feedback we received on the premiere issue. While there were some problems, it was an overall success, thanks to you — the readers. We're making every effort to ensure each issue is better than the previous, and your feedback is invaluable, so please keep it coming.

Also, I received a very favorable response to my first editorial. I wanted to let you know that my editorials will focus on many topics, and several will be the current weaknesses in the industry. If we are to improve the industry, we'll have to start taking responsibility and pointing out the problem areas. While it's great to spread sunshine and joy around the community, I believe it's detrimental to avoid discussion of the problems. The goal of this column is to make the people who created and support this industry start taking responsibility for what they have created. It's the only way we'll ever improve the mess we currently have.

OK, now for the focus of this particular ranting. Well, maybe not ranting but a general feeling of disappointment with the state of support in the 3D software industry. How many of you have encountered problems with your 3D software? Alright, problems do exist in any program so let's take a different angle. How many of you have reported problems only to be ignored by the software developer? OK, that surely hit a sore spot. For some unknown reason the software developers in this industry like to ignore their users. I can't, for the life of me, imagine why they would adopt this type of business practice, particularly since the users are the sole support of the developer.

When will they finally stop the race for more new features and focus on making the ones they currently have actually work? What is the twisted reasoning behind making the paying user perform the tasks of a BETA tester? Why are programs shipped before the bugs are resolved? This is a pathetic business practice. Why would I want to pay for something that doesn't work properly? I wouldn't! Bug testing and resolution is the responsibility of the developer, not the user — particularly when the user paid for a program that was advertised as working! Why do they push "new and improved" modeling techniques when the old ones were better and more reliable? Why? Why? Why?

They seem only interested in one thing, our hard-earned money. Sure, business is about making a buck, but it's also about a responsibility to the market. What happened to selling a great product at a great price? Maybe I'm too old, but I remember when servicing the customer was the primary focus of a business. Somewhere along the line they seem to have forgotten that if you make your users happy, they will stick with you for life. Just look at how many programs you own and ask yourself why? I'll bet it all comes down to support. If the developer had properly supported you to the point where problems were resolved and you were educated on the product, you probably wouldn't have switched to the new program. Right?

There are many entities willing to support the users in the industry, though it seems very few are the actual developers. I commend the efforts of those who have sacrificed their time and energy to support this industry. Without them we wouldn't be as far along as we are today.

To the developers in the industry — well, not all of you are problematic, though most of you are. Those who are hang around this industries neck like a ball and chain, pulling it down, while those with a sincere concern struggle to advance it. We need to cut the dead weight so this industry can fly. How about it, developers? Are you up to the challenge?

Bill Fleming

Bill Fleming
Editor in Chief
Bill@komodostudio.com

Free Stuff...
3D CAFE™
The Ultimate Resource for Computer Graphic Artists
http://www.3dcafe.com
Sound Editing
Max, Lightwave Softimage, Plugins!
PyroCluster v1.5
Great Deals!
3D Model Collections
LightWave 3D
Advanced Features
featuring John Gross
Powerful Imaging Tools for Maximum 3D Control
3D Studio MAX 2
NEW FEATURES
HIGHLIGHTS
Introduction to SOFTIMAGE 3D
3DS MAX PROFESSIONAL TECHNIQUES
Interior Lighting and Environment Creation
Creating Organic Models using Lofting and Deform Fit
Lip-Synching to Existing Dialogue
Modeling with Patches and Creating Fur
Photoshop Plugins
MorphMagic
Professional VHS Tutorials
Much More!!!
Kelly

Creature Design

Part Two: "The Surfacing"

By Bill Fleming

Welcome to the second part of our two part series on Creature Design. In our last conversation *(Volume 1, Issue 1)* we discussed the principles behind creature model design, which is the foundation of a realistic creature. Nothing is more important that a solid foundation. A weak model will completely undermine the realism of your creature, no matter how well you surface the model. On the flipside, an excellent job of surfacing your creature will help to compensate for shortcomings in the model, but the perfect solution is to apply proper detail to the model and then support it with highly detailed surfacing.

In this session we will discuss the principles of realistic creature surfacing. This is the aspect of your model that brings it to life. A properly detailed surface is crucial, yet we so rarely see it in 3D creatures. Typically we see rather simplistic and plain surfaces, which tend to make the creature appear artificial. They lack the details we find in real creatures. Even the most simplistic creature in reality has a tremendous amount of surface detail. This detail can take the form of extraordinary skin textures, outrageous color patterns or merely a plethora of wrinkles. There is always some element of the surfacing that stands out on close inspection. You'd be surprised at how easily you can make a model appear realistic by merely adding some surface detail. In fact, let's take a look at the example shown in Figure 1.

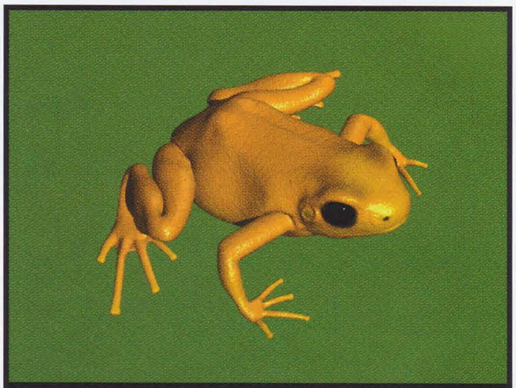


Figure 1 Golden Mantella Poison Dart frog.

Here we have a Golden Mantella Poison Dart frog from Madagascar. The Golden Mantella is a very simple creature when it comes to surfacing. They have no real color patterns but they do have a detailed skin texture. Notice the chaotic bump on the skin. This is the element of the surfacing that makes the model appear realistic. This simple skin texture makes the model come to life.

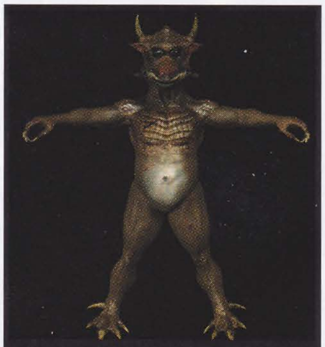


Figure 2 Chubbs.

You'd be surprised at how easily the human eye is tricked into believing something is real. For example, have you ever looked at a 3D image that was full of detail and thought it was real? Maybe it was an image of a room full of clutter and chaos. On first glance it appeared real because of the detail in the image, but on closer inspection you soon realized the models and surfaces were obviously not realistic. That's the power of detail. Detail (clutter and chaos) is the foundation of photorealism. It's the anchor that makes your objects and images appear realistic. For a creature to be photorealistic it must possess surface detail.

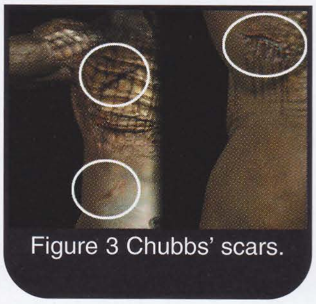


Figure 3 Chubbs' scars.

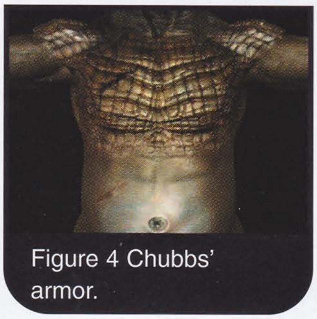


Figure 4 Chubbs' armor.

OK, so that was a relatively simple example of surface detail. Before we take a look at a more complicated example we'll need to first examine the creature's biography. Yes, it's that old biography thing I keep pushing. Nothing, and I mean nothing is more important than the biography when creating photorealistic creatures. It's the one element of the design that defines everything about the creature.

When it comes to surfacing a photorealistic character, the first questions you need to ask yourself are the same questions any good actor asks when preparing for a role: "Where did I come from?", "Where am I going?" and "How did I get here?"

Not to sound overly dramatic, but that's basically it. Before you can apply the skin to your character, you need to know where that skin has been and what it has encountered. Without this knowledge we cannot properly surface the creature. To better illustrate this principle, let's take a closer look at the Chubbs character we discussed in the previous issue. As we explore his biography we'll examine his surface details and the justification behind them.

A Surfacing Case Study

Chubbs, shown in Figure 2, is a one-inch tall alien that lives thousands of feet beneath the earth's crust.

As you can see, Chubbs is a very detailed creature with a tremendous degree of surface chaos. All of this chaos is well justified, as we will soon see. To better understand Chubbs' surfacing we'll need to take a close look at his biography. As we come across a specific reference to surfacing in the biography we'll stop and take a look at Chubbs' surfacing. To keep us from getting confused I've made the biography text italicised. OK, let's get started.

Chubbs is the last of a long line of warriors who were bred for violence. When he was but a wee Chubby lad, he promised his venerable dying father that he would strive to unite and protect the last remnants of his vanishing race from extinction.

As you can see by Chubbs' heavy build, he requires vast food stores in order to keep his girlish figure. The only problem is that his main food source, the nymph beetle, is also the main food source of the Jartung Dogth. The Jartung Dogth happens to be a fiercely competitive, 6 legged, underground weasel, which would like nothing better than to see the end of Chubbs' family bloodline and to annihilate the last of the small Chubby tribe. Considering that Chubbs is only an inch tall, while the Jartung Dogth is well over eight inches in length, you can see Chubbs has his work cut out for him.

Alright, this is a good place to stop. The first line of the biography is very important. It mentions that Chubbs is a warrior, bred for violence, which tells us a great deal about his surfacing. We can assume from this description that Chubbs has had his share of battles. Even the most seasoned warrior will have their share of battle scars so we would need to incorporate these scars into Chubbs surfacing if we wanted him to be convincing. Figure 3 shows some of the many scars on Chubbs.

As you can see, Chubbs looks like he's had his share of battles. The circled scars in the image help to reinforce the character biography as well as break-up the surface. You'll notice the scars on the chest and belly have begun to heal, the belly being more advanced than the chest. Now take a look at the scar on the back. This one is fresh, showing dried blood beneath it. This is a nice touch since it tells us that Chubbs has recently engaged in battle. It doesn't tell us if he won but we know he walked away from the battle.

Since were on the subject of battle, let's take a moment to examine Chubbs' body armor, shown in Figure 4. Here we have Chubbs' chest armor, which is heavily plated like an alligator. Since Chubbs is a warrior we can assume that he has some form of armor. He's not a warrior like humans who wear clothing, so Chubbs needs his armor incorporated into his skin, much the way an alligator, rhino or armadillo does. All of these animals have built-in armor to protect them. Chubbs possess heavy plated scales like that of an alligator, which serve to protect his vital organs. They protect him from direct blows, but also deflect the blow with their slippery surface. A boxer wears vaseline on an open cut to deflect the impact of a blow so it doesn't open the cut more. Chubbs oily chest plates serve the same purpose. He also has similar surfacing on his elbow joints to protect them in battle.

Now take a look at the skin covering his belly. Notice how it's softer, more like a human's skin, which makes him vulnerable in this area. It's always a good idea to include some area of vulnerability on your characters since their predators need some way of penetrating their defenses. In reality every creature is vulnerable in their belly region. This vulnerability is incorporated so they can be vanquished. Otherwise they might over populate.

OK, these are the surface elements that relate to battle. Now let's continue with the biography.

Struggling much of the time, buried deep within the strata of the earth, nature has kindly provided Chubbs with a very useful camouflage.

OK, now were ready to examine Chubbs' skin coloration, shown in Figure 5

You'll notice that his body colors are earth tones: tan, reddish-brown and rust, which allow him to blend into his environment. The majority of creatures in reality are camouflaged to blend into their environment. It's how they avoid predators. Well, the same applies to a character like Chubbs. Since he's merely an inch tall, he needs to be well camouflaged to avoid being eaten, as well as hiding himself during battles. It's important to understand the environment/habitat of your creature before you begin surfacing it. For example: if Chubbs were green he would make no sense in an underground habitat. On the other hand, if he were living in a jungle, green would be the logical choice for coloration.

For Chubbs to blend in with the environment he needs to be surfaced with a variety of earth tones such as brown and rust. If Chubbs were standing in the middle of a wooded trail you would probably walk right past him. OK, so he's small enough to miss even in the middle of your living room but you get the point.

OK, that covers the skin coloration. Now let's wrap up the biography.

Although Chubbs can be fierce, he's also a very wise warrior with considerable cunning. He's certainly not a mindless brute. In fact, he is often immersed in moments of deep contemplation. After all, wouldn't you be if the weight of your species' survival balanced on your shoulders? I should hope so.

When he's not responsibly involved in the mixed roles of provider and protector for his people, Chubbs can be found playing a unique version of chess whereby the two players sit astride an ornamented Raven's beak, and use diamonds as playing pieces. Something that no doubt makes J.P. Morgan roll over in his grave.

Well, the surfacing message is well hidden in this description but if you use your imagination and look at Figure 6, you'll soon discover it.

Well, it's not the prettiest sight but it shows a very cool detail. As you have probably noticed, Chubbs has a number of pimples on his butt. These are the result of sitting in dirt most of the time, either in contemplation or merely playing a game of chess. Since Chubbs doesn't wear clothing, his skin is subject to many environmental hazards. One in particular is dirt. When he sits for prolonged periods of time, dirt will make its way into his pores, clogging them and causing pimples to appear. It's a rather unpleasant problem but one that tells us a great deal about Chubbs and his environment. It's also a great chaotic detail that you'll probably never find on a 3D creature.

To continue our focus on the backside of Chubbs, let's take a look at Chubb's back, shown in Figure 7.

Since we're speaking about dirt, we shouldn't forget to cover the other signs of dirt exposure on Chubbs' skin. Take a close look at Chubbs' calves and feet and you'll notice a light brown coloration. This is an indication of the dirt Chubbs picks up when walking through the muddy tunnels. It's old, dry dirt. This is a great detail, which tells us about the environment where Chubbs lives.

It's important to reflect the habitat in which your creatures live when creating their surfacing. An auto mechanic is easy to spot by the oil stains on their clothing, a butcher by the blood on their apron or a computer artist by the callus on their wrist from scraping a mouse pad 14 hours a day. We all show signs of the environment we inhabit and the work we do — therefore your creatures must reflect the same.

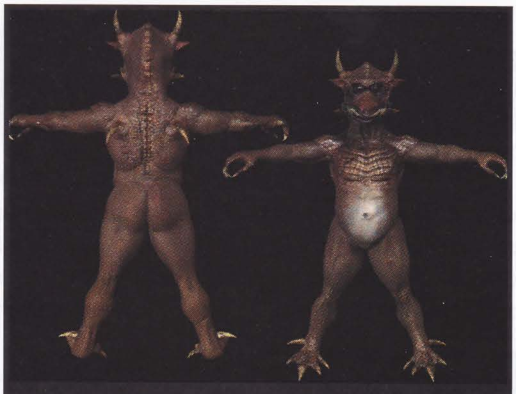


Figure 5 Chubbs' camouflaged skin coloration.

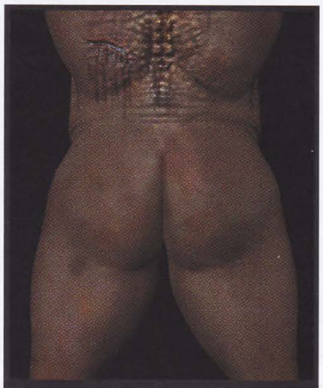


Figure 6 Chubbs pimpled butt.

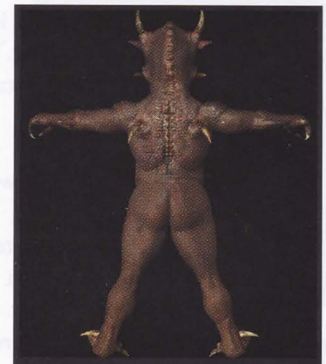


Figure 7 Chubbs' back.

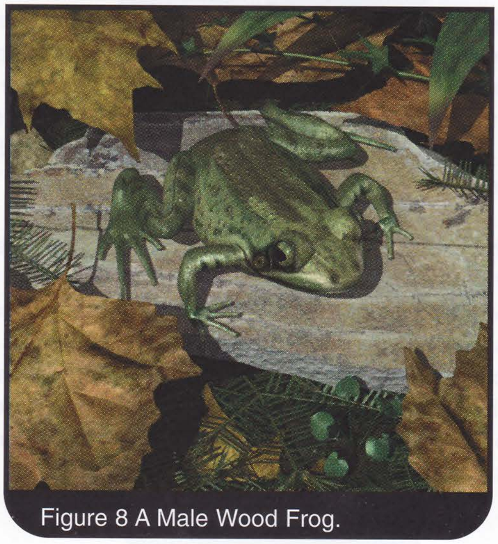


Figure 8 A Male Wood Frog.

Of course, this may not always be a large detail. In the case of amphibians it may merely be the shiny, tacky skin texture, which shows they spend time in the water. You might also add mud or even clumps of dirt to the hair of a mammal that spends time in the water, like a beaver, otter or even a bear. A pig would probably have some dried mud on their skin. The same would apply to an elephant or rhino. As you can see, there are many possibilities. Be sure to thoroughly explore the environment of your creature before surfacing it so you can incorporate the proper details.

Well, that about does it for this case study. As you can see, working from a detailed biography makes creature surfacing a great deal easier. It becomes less of a chore and more of a creative adventure! We're able to help create the reality of something, which certainly does not exist. At the same time, we can help to bring about a reality that others can enjoy.

At this point, Chubbs becomes something more than a mere 3D character; he becomes a living, breathing incarnation with a distinct personality. A creature biography gives us a profile that we can utilize to create the appropriate skin, wrinkles, scars, bruises, scales and other surface attributes which are the result of the character's experiences and life.

Detail, Detail, Detail!

Ok, that was a great example of determining the surface details for a detailed creature. Now not all creatures have such a detailed biography. Your creature might be something as simple as a frog, or any other common creature found in reality. If this is the case, you'll need to gather some adequate source material from the bookstore or library and adhere to the surfacing details you see in the images. It's important to incorporate the details if you want the creature to appear realistic. Since we already have some preconceived notions of most real-world creatures you'll need to be rather exacting with your surfacing to convince us the creature is real.

One thing to note about real-world creatures is that their surface colors are rarely consistent. There is always some level of color shifting across the surface. This is a critical element to add to your surfacing if you intend to make it realistic. Let's take a look at an example that illustrates this point. Examine figure 8.

Here we have a male wood frog. Now frogs are typically one color but tend to have many subtle variations of that color. The frog in this image has a basic color of green but then has many variations of green, many leaning towards brown. It is this color shifting that adds credibility to the surfacing. It's also an important aspect of camouflage. A solid color would stand out in the frog's habitat, but a variation of colors will blend nicely with the surrounding elements, such as bark, leaves and dirt.

You'll notice that even the solid colored toes have little speckles of dark green on them. There is nowhere on the frog that doesn't have some color changes to break up the surface. This is just another example of how important surface detail is when creating realistic creatures.

Surfacing your creatures is very simple if you rely heavily on the source material Mother Nature has provided. You can't go wrong by borrowing elements from real-world creatures—even when creating fantasy characters. If your creature is amphibious, use frogs and salamanders for source material. If it flies use birds or bats. If it lives in a desert use reptiles, rhinos or elephants. Borrowing surface elements form these creatures will go a long way towards making your creature photorealistic.

Wrap Up

Surfacing your creatures can be a lot of hard work, but it can also be very rewarding. Remember, when creating your creature surfacing, you should walk a day in their shoes, getting to know their environment, their struggles and triumphs. All of these experiences will take you a great deal closer to creating realistic surfacing.

Don't treat your creature surfacing as an afterthought. It's the crowning element of a 3d creature, so be prepared to invest some time in the development of your surfacing to ensure the quality and believability of your creature.

Subscribe to
trueSpace Magazine
800-353-0100

POST FORUM
macintosh digital video resources
www.postforum.com
articles
reviews
discussion boards
software

Surfacing Secrets

Part 2

By Bill Fleming

Welcome to the second part of our two part series on The Secrets of Surfacing. In the last issue we covered the different image mapping methods, surface attributes and methods for guarding against image map stretching. These elements are the foundation of surfacing. If you don't have a copy of our first issue I strongly suggest you pick up a copy through our order department (800-353-0100) or Animation World Network (www.awn.com) and read the first part of this article. It will give you a better foundation for what we are about to discuss.

OK, now that we have a handle on the technology let's talk about technique. In this article we'll be taking a look at the technique behind seamlessly surfacing your organic models. When I say technique I'm referring to the methods of creating the different types of image maps and how to make them perfectly seamless. We discussed the technique for determining the seams in the first part, now we'll talk about how you remove them.

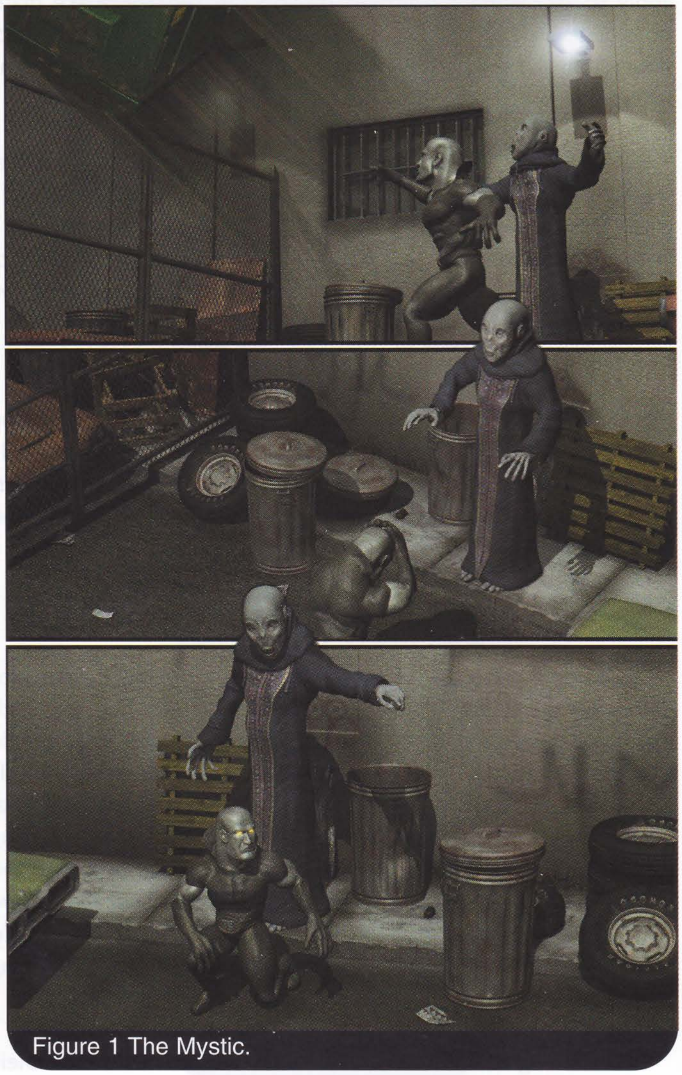


Figure 1 The Mystic.

There have been a number of techniques offered for seamlessly surfacing organic models. The most widely accepted method would be the UV map, which used a single image that is wrapped around the surface of the model. This technique has typically only been available on NURBS models but is now becoming an option for polygon models. The one shortcoming of this technique is the way the mesh is unwrapped for the painting template. It can be very difficult to paint on the template when the rotation of the mesh is not all on the same axis. When a surface is unwrapped for UV mapping the mesh in the template will be rotated depending on where that portion of the mesh lies on the model. Meaning, you may need to paint upside-down on the template for one portion of the map, then paint sideways for another. It can be very frustrating. Another shortcoming is the ability to create decal maps for specific areas on the mesh. Most programs with UV mapping will not allow you to add a simple planar map as an additional layer, so you can apply details to a specific area of the mesh, like bumps on an ear. Instead, you need to create a map for the whole head, which is literally blank except for the small area where you want the bumps. This isn't the most effective means for surfacing.

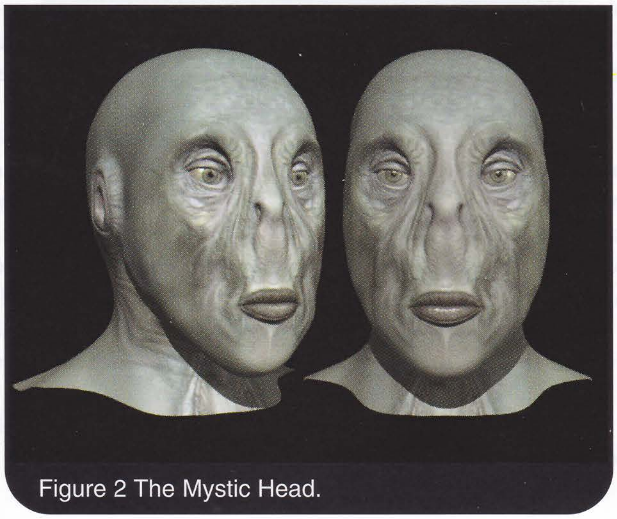


Figure 2 The Mystic Head.

Alright, so what are the other options? Well, currently there are a number of proven techniques for polygon models but only a few stand out as useful options. In previous articles I have covered the most common technique, which is using planar maps to seamlessly surface your polygon models. This is still the best option but there is modification to this technique that makes it more powerful than a UV map - Alpha Maps. In this article we'll be covering the use of Alpha Maps in seamless surfacing. I'll be showing you how you can quickly and easily remove all the seams on your models in minutes. Of course, this technique won't work in every 3D program. That's why we like to cover a few options so there is a solution for everyone. OK, so let's take a look at the most powerful technique for creating seamless surfaces on organic models.

Alpha Maps - The Perfect Seamless Solution!

An Alpha Map is merely a transparency layer for an image map. It filters a portion of a specific image map so you can limit the area of the map that is shown on the model. This technique is commonly used to decal models with simple details like labels on transparent objects. For example, if you are creating a transparent object where a label is printed directly on the glass, rather than a paper label, you can use an Alpha Map to apply the ink to the glass. You simply paint the details for the label over your template and create an Alpha Map for the label to filter out the portion of the image map that you don't want to appear on the glass. Now you have a label printed directly on the glass, with the rest of the glass being untainted.

An Alpha Map works under the same principle as a Transparency Map. The portions of the image that are white will be opaque and the black will be transparent. Any point in-between will be semi-transparent. This means you can not only clip a portion of the image but also feather it, making Alpha Maps an ideal candidate for seamless surfacing.

To help illustrate this concept we'll take a look at how the head of the Mystic character from the Platinum comic book was surfaced. In Figure 1.

Here we have an actual page taken from the premiere issue of Platinum. We've removed the text so you can see the images. Notice the detail on the Mystic's face. It's this detail that makes him believable. It also greatly complicates the task of surfacing the character. Let's take a closer look at the Mystic's head, shown in Figure 2, so we can see the results of using Alpha Maps to surface organic models.

As you can see, there are no visible seams or stretching on the surface, making the head appear very realistic. This is the beauty of the Alpha Map. It allows you to add extreme detail to the surface, without suffering the dilemma of painting an irregular UV map. Now that we've seen the result of using Alpha Maps, let's take a look at the steps taken to surface the Mystic head.

Seamless Surfacing with Alpha Maps

Surfacing a model with Alpha Maps is a bit different that the typical approach. Usually you'd create the surface selections to be planar mapped first, then you'd start painting the images. When using Alpha maps you want to do the opposite. Well, not entirely but you'll see what I mean in a minute. Let's run through the steps of seamlessly surfacing an organic model with Alpha Maps.

Step 1: Defining the surfaces for the model.

In the previous article we discussed the technique of applying a grid map to the model to determine the areas of image map stretching. This is the first thing you'll need to do when seamlessly surfacing a model with Alpha Maps. You start by eyeballing the surfaces, meaning you visually determine the potential areas of stretching and define the surfaces of the model so it can be planar mapped from all sides to avoid the stretching.

Using the grid image map allows you to be very exact in determining the stretching areas. You'll see a noticeable distortion in the map where the problem areas occur. To correct the problems you render orthographic shots of the model from all axis, then load the renders into your modeling program to act as a template for determining exactly which polygons are the problem. Then you simply select the polygons and add them to a current surface or create a new surface.

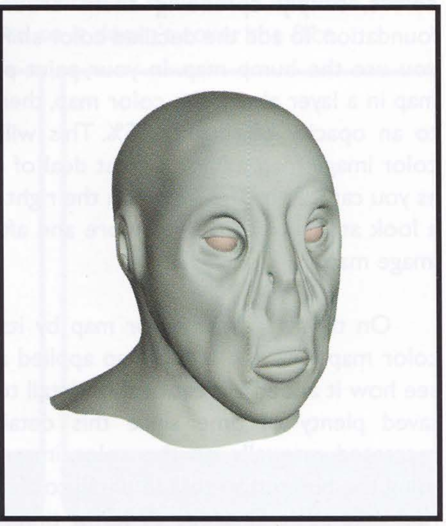
OK, now here's the important step. When you are finished assigning the surfaces to your model, save the model and then combine all of the surfaces into a single surface and save the model as something like "AlphaBase". This is the model you will use to begin the Alpha Map surfacing. Yes, it sounds odd but you'll soon see why this is important. In fact, this brings us to our next step, which is creating the initial image maps.

Step 2: Painting the initial image maps.

When surfacing a model with Alpha Maps you want to start with the model as one, single surface. The image maps you create for this surface will serve as the foundation for all the other surfaces you will assign to remove the image map stretching. Figure 3 shows the Mystic head without the surfacing.

As you can see, a single surface selection has been made for the head. When surfacing complex objects it's always wise to assign a different color to each surface so you can see where they meet on the model. This helps when determining

Figure 3 The unsurfaced Mystic Head.



potential seams. In the case of our Mystic head, we have a single color since we have made the head one surface so we can Alpha Map it.

When painting the single surface you want to start with the direction of male focal observation — Basically, the front of the model. In the case of our Mystic head, we started with the face. The first step was to render a template as we discussed in the prior article. Once you have a nice orthographic template of the characters head you are ready to begin painting the facial details.

When you paint image maps for creatures, you need to start with the bump map first. Why? Because it's the foundation for all of the other image maps. The bump map tells you where the colors will change their hue. When you add a crack in the skin you'll find you need to darken the pigment in the crack to make it appear more natural. In addition, you'll also need to diffuse the crack more because less light enters and escapes the cracks. A crack in skin looks unnatural without some level of additional diffusion. Also, the bump defines the specularity since the peaks of the wrinkles will be more specular than the valleys. While it's true that sweat would collect in the crack, it also receives less light and is therefore less specular.

Once you have a well painted bump map, you can quickly develop all the other image maps within a few minutes. Let's take a look at the image maps used on the face of the mystic and explore their development. Take a look at Figure 4 which shows the Bump and Color maps.

The image on the left is the bump map. Notice the high level of detail in the map. A properly created bump map will reflect a great deal of the character in the surface. It's important to add irregularities to the surface for it to appear natural. You can see how the face was given a great deal of texture, down to the little pores in the forehead. This is an essential detail in a good bump map.

Once you have the bump map completed, you use it as a tool for quickly adding detail to the color map. When creating the color map you should keep it relatively basic with the colors, simply spreading them around to create a basic foundation. To add the detailed color shifting and changes in hue, you use the bump map. In your paint program load the bump map in a layer above the color map, then adjust the bump layer to an opacity of roughly 15%. This will effectively diffuse the color image map, adding a great deal of detail to the color map as you can see by the image on the right of Figure 4. In fact, take a look at Figure 5 to see before and after images of the color image map.

On the left is the color map by itself, on the right is the color map with the bump map applied at 15% opacity. You can see how it added a great deal of detail to the image map. It also saved plenty of time since this detail doesn't have to be recreated manually on the color image map. This method of using the bump map to add detail to the other image maps is a real time saver. Speaking of saving time, the same method was used to create the diffuse and specularity maps, which are shown in Figure 5.

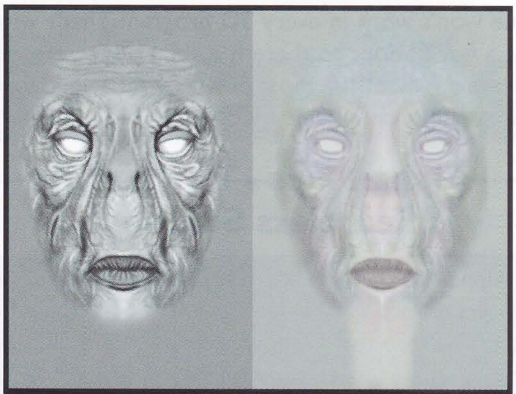


Figure 4 Color map (left) and Bump map (right) for the Mystic.

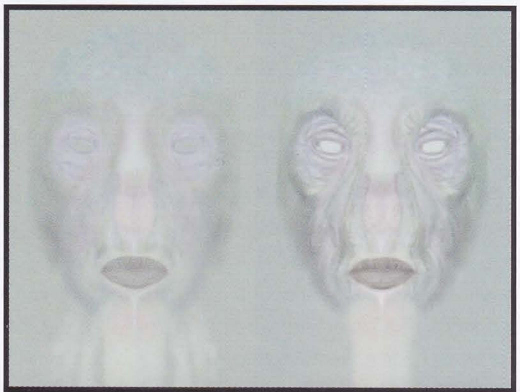


Figure 5 Before and after the Bump map is applied to the Color map.

In Figure 6 the Diffuse map is shown on the left and the Specularity map on the right. You can see how the area at the base of the skin cracks is now diffused with a darker color, which is a product of adding the bump map to the color map. The Diffuse map is created from the color map by making it grayscale. The same process is used to create the Specularity map. Take a look at the image on the right and you'll see the Specularity map for the Mystic. Notice how the cracks in the skin are darker while the peaks of the wrinkles are lighter. This is created by merging the bump map with the color map. The specularity of the cracks would be low while the peaks would be high. As you can see, the Bump map is the most critical image map — It's the foundation of your entire surfacing campaign.

OK, now that we have the image maps completed for the face, we can map them to the model to begin the seamless surfacing process.

Step 3. Establishing the base surface.

The first surface you map on the model becomes the base coat of paint for the object. It's the foundation you will build upon when creating the other image maps. What you want to do is Planar map the initial image maps to the front of the model.

Yes, the sides will show stretching but this is easily fixed in the next step. Figure 7 shows the Mystic head with the initial image maps applied.

As you can see, there is stretching on the top of the head, which means we'll need create a new surface in this area. The sides look pretty good right now but they will need a great deal more detail for the model to look balanced, so this too will need a new surface. Also, the back of the head will need a new surface so we don't have his face repeated on the back.

Remember back in Step 1 where we talked about determining the surfaces? Well, now it's time to use them. Fist, the surface just created needs to be saved so it can be loaded later. Most 3D programs will allow you to save surface attributes in a file you can recall later. Once the surface is saved, the previously saved model (with the surface selections created to avoid stretching) is loaded. The next step is to copy the surface attribute just saved to the front surface of the head, creating something similar to Figure 8.

Here we see the facial maps have been reapplied to the head. We can also see the top, side and neck surfaces represented in different colors. To complete the "base coat" of surfacing, the facial surface attributes need to be copied to all of the other surfaces, creating the same look we had when the head was a single surface. Now it's time to move on to the next step where the surfacing becomes seamless.

Step 4. Creating the Alpha Maps.

To remove the stretch marks we need to create image maps for each of the defined surfaces. We'll use the top of the head as an example since it exhibits image map stretching. The first thing you need to do is create a painting template. This is accomplished by hiding all of the other surfaces and rendering an orthographic view of the surface. Why hide the others? We need to render the template with the stretched surface shown so we can paint the details to match the seams. If you have the other surfaces visible you won't know where to crop the image for the template. Hiding all of the other surfaces by setting their transparency to 100% allows you to render only the desired surface. Figure 9 shows the template rendered for the top of the head.

Once the template is created you need to load it into your painting program and start adding the details. Basically, use the front template to determine the details needed. In the case of the Mystic, I painted the speckled dots across the top of the head. This was accomplished by cloning the spots from the front image map, then tweaking them to match the template.

OK, so now that we have the basic color image map, we need to create the Alpha Map. Why? Well, we discussed earlier that the Alpha Map is really just a transparency map for an image. The key behind seamless surfacing using an Alpha Map is to first create a base coat with the front map, then create a specific map for a desired surface and add it as a new layer with an Alpha Map. The Alpha Map is used to feather the outside edge of the image map so it blends with the layer beneath it — creating a perfect seamless surface. It's a very simple process and the results are amazing. Let me illustrate this idea. Let's take a look at the top color map and it's associated Alpha Map shown in Figure 10.

On the left we have the color map, and on the right is the Alpha map. The white area of the map represents 100% opacity, The black area is where the image map will be transparent. As you can see, the edge of the image map will be blended into the surface below. To create an Alpha Map, add a new layer in your paint program, then use a selection tool to select an area just inside the edge of your template — probably around 5-10 pixels. Now, feather the selection about 5 pixels and fill the selection with White. Invert the selection and fill it with black. You now have an Alpha Map for the image map you just created.

If you apply the new Color and Alpha Maps as an additional layer of color over the existing stretched map, you'll completely remove the stretching and the seam. Of course, this technique can also be applied over the same surface to remove the need for surface selection. Take a look at Figure 11.

This figure shows how the side of the Mystic's head was surfaced using the same surface selection as the front of the head. The front was planar mapped on the 'Z' axis and the side was mapped on the 'X' axis as a new layer over the original color layer, using an Alpha Map to filter the side image map. The edge of the side map is feathered so it blends in with the details on the front, and cropped so it doesn't cover the face.

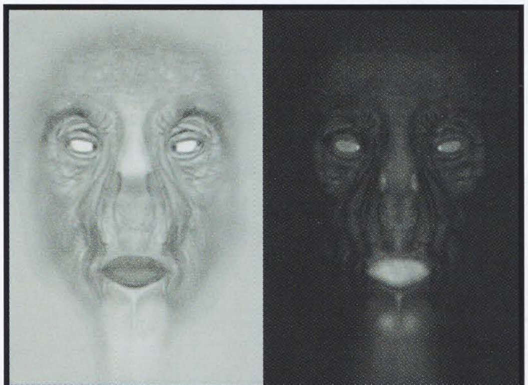


Figure 6 The Diffuse and Specularity maps for the Mystic's face.

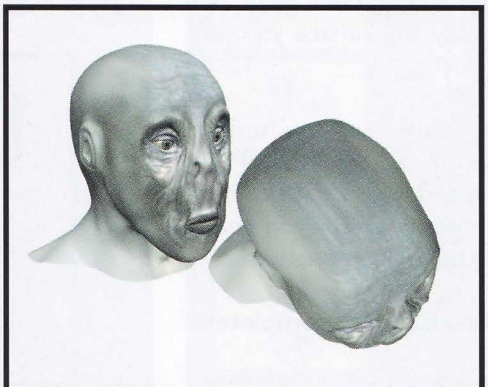


Figure 7 The Mystic with initial image maps applied.

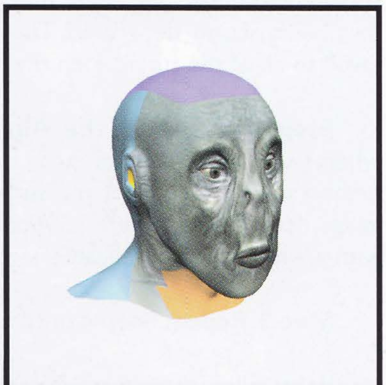


Figure 8 The surface selections for the Mystic's head.

In this example, when the back of the head was surfaced, it actually fell right in the middle of the head — meaning it overlapped the side surfacing. This wasn't a problem since the surfacing on the front surface was copied to the back. Then, all of the surface details for the "front" of the face were removed so he wouldn't have a face on the back of his head. A template was then rendered and a new image map for the back of the head was created and layered over the current side surface, using an Alpha Map to blend it.

Step 5. Repeat Step 4 until all surfaces are completed.

Now that the first surface has been completed, it's time to move on to the remaining surfaces, repeating step 4 until you have fully surfaced the model. Keep in mind though, if you have a surface like the front of the Mystic's head that needs multiple layers, (such as the side) you should complete this first, before moving on to the other surfaces. You'll need it completed so the side would be seamless when creating the top and back.

As you can see, the Alpha Map is a very powerful and useful tool for adding extreme detail to your organic models without pulling out all of your hair. It actually seems more complicated than it is. It just takes a bit of practice. After a couple of models you'll be a pro and it will be second nature.

Wrap Up

OK, that about does it for the Alpha Map technique. Let's revisit the steps briefly to be sure we are on the same page.

Step 1: Defining the surfaces for the model. Define all of the surfaces on the model to ensure there will be no stretch marks. Then save a copy and load the original, single surface model into your rendering program.

Step 2: Painting the initial image maps. Render a template of the model and then paint the main (front) image map, starting with the bump map and then doing the color, diffusion and specularity.

Step 3. Establishing the base surface. Map the image maps you just created to the front of the model. Save the surface attributes and load the model you saved with the multiple surfaced designated. Then copy the surface you just saved to all of the surfaces on the model.

Step 4. Creating the Alpha Maps. Select a surface where stretching occurs and hide all others. Render an orthographic template of the surface and then paint the new image maps. Finally, create an Alpha map by creating an image with a white center and feathering to the edge with black.

Step 5. Repeat Step 4 until all surfaces are completed.

If you follow these five simple steps to the letter, you'll soon be on your way to a perfectly seamless surfacing job! Seamless surfacing isn't a piece of cake, but the right technique will turn your sour apples into cider. Ok, that was a pathetic analogy, but you get the idea. It's all about technique.

Now, if your program doesn't have Alpha Map capabilities, just use the same technique and basic steps, except you won't create an Alpha Map, but rather an image that would need to be as seamless as possible. It's more work but not impossible. I used this technique very successfully on many models before I discovered the Alpha Map.

Well, that's all for now. Be sure to keep an eye out for our upcoming Creature Workshop column where we will feature an article every issue that's strictly focused on creature development.

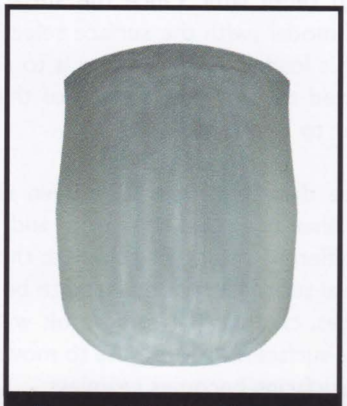


Figure 9 The template for the top of the head.

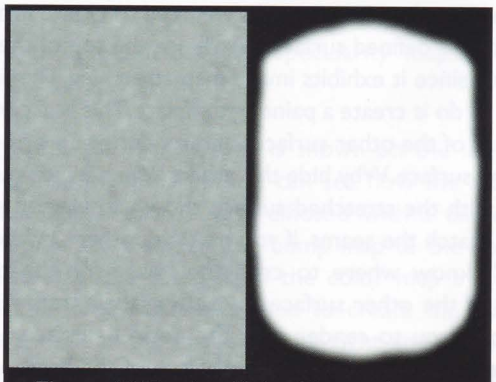


Figure 10 The top Color Map and Alpha Map.

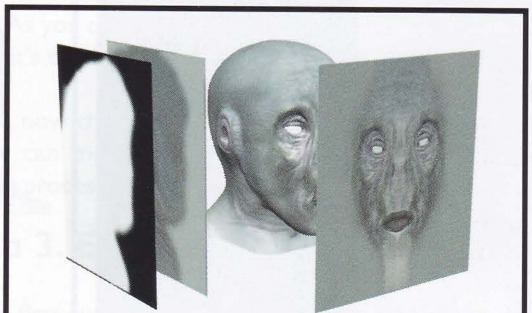
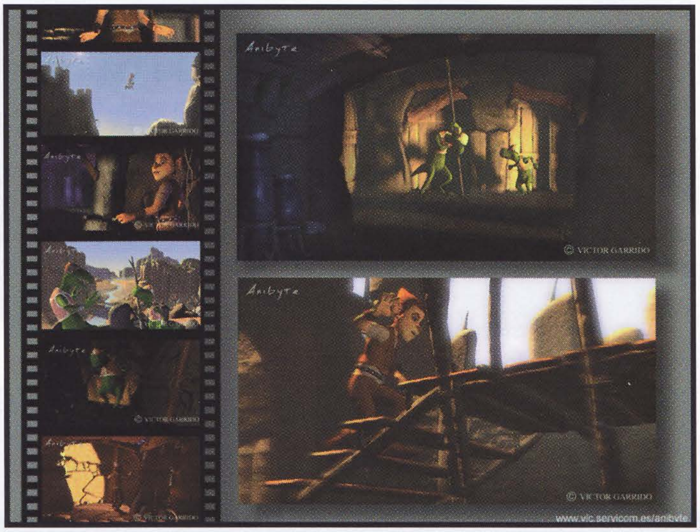


Figure 11 Using an Alpha Map to apply maps to the same surface.

Feature Artist

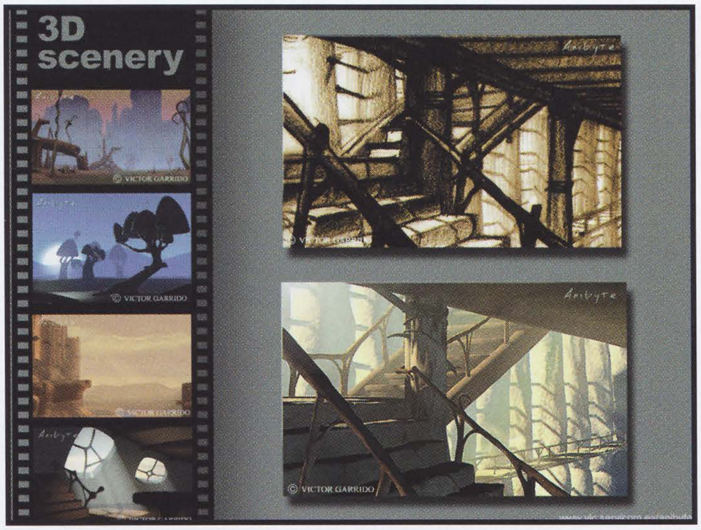
Victor Garrido


Anibyte
© VICTOR GARRIDO
www.vic.servicom.es/anibyte

Artist: Victor Garrido
Email: victor.garrido@vlc.servicom.es

Victor Garrido has been a Computer Graphics teacher at a University in Spain and has been involved as a 3D professional since 1990. He has worked for several broadcast companies which involved 3D advertising, children shows and animation for video games.

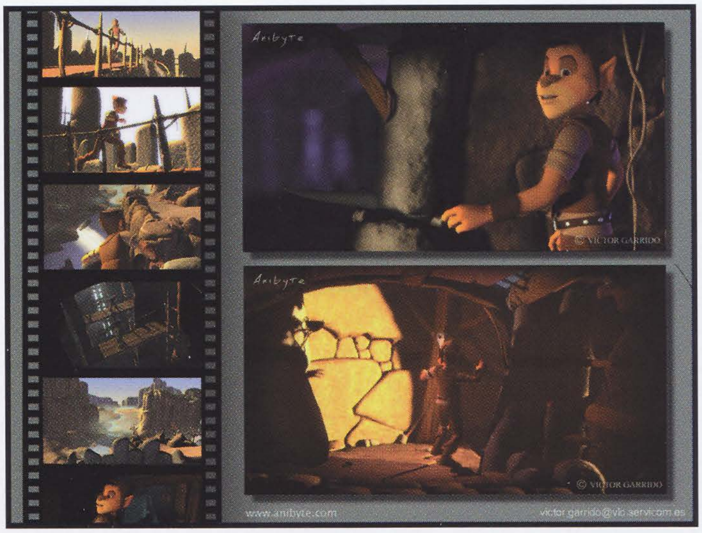
Anibyte is the name of the team of animators Victor has brought together, taught and is working with. Currently, Anibyte is working on a film project with a very large pre production schedule (1500 sketches, hundreds of objects and sceneries, etc.) You can see some of the 3D shots below.

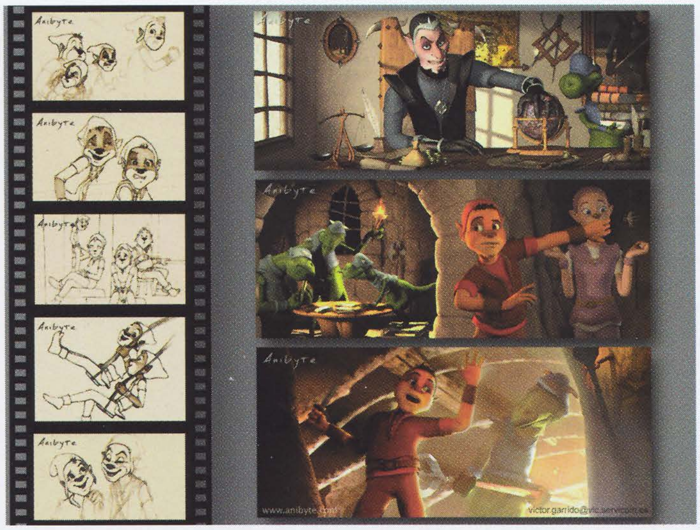

3D scenery
Anibyte
© VICTOR GARRIDO

"The sketches and the adaptation of this film style to 3d is very basic to me." Says Victor, "My main objective was to communicate directly with children using a fantasy world with characters that tend to make the public forget that they are watching a 3D film."

Victor is using Max2 for the production. In fact, you can see some of his images in the Max2 manuals and demo reel. He also uses character studio, a powerful tool. "I use Max2 because it's a complete program that has a good quality to price ratio. Enjoy the images."

Victor and the Artibyte team are also responsible for the image on this issue's table of contents. You can find out more about Victor Garrido and Anibyte by going to www.anibyte.com


Anibyte
© VICTOR GARRIDO
www.anibyte.com
victor.garrido@vlc.servicom.es


Anibyte
www.anibyte.com
victor.garrido@vlc.servicom.es

LightWave

Modeling a Living Toon

By Bill Fleming

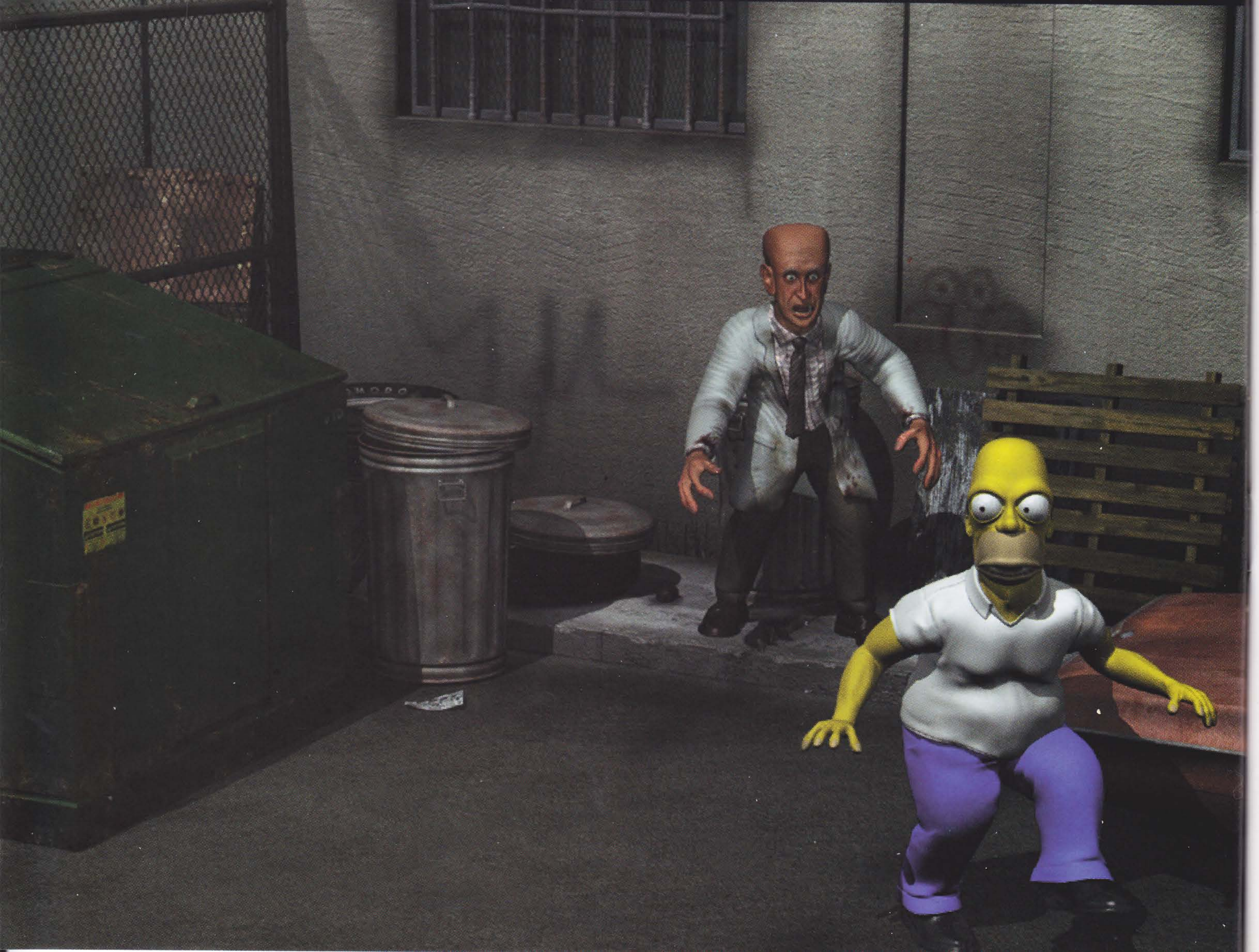
In this tutorial we'll be modeling a Level 3 Living Toon. Actually, to better illustrate the awesome appeal of Living Toons we're going to transform a popular cartoon character into a Living Toon. Our cartoon character will be Homer Simpson, who is probably the most popular cartoon character of all time. Homer makes a perfect Living Toon because he exudes personality.

When transforming existing characters into Living Toons you have to decide which level is appropriate. Not all characters make a good Level 3 Living Toon. Since the majority of Homer's personality comes from his yellow color we can't afford to make him a Level 3 Living Toon without losing his appeal. Homer is better suited for a Level 1 Living Toon so we can maintain his colors and still exhibit the traits of a humanoid.

One of the great things about Living Toons is that they look great in photorealistic scenes. I've always enjoyed merging cartoon characters and reality, and of course, the blending of humans in a cartoon world. The crossover is very cool. What's even better is when you can combine multiple levels of Living Toons into a photorealistic world. For example, take a look at Figure 1.

Here we have Dr. Dread, a Level 1 Living Toon, stalking Homer, a Level 3 Living Toon. Dr. Dread is hoping to catch a

Figure 1 A Level 1 and Level 3 Living Toon in a photorealistic world.



cartoon character to add variety to his twisted experiments. Looks like Homer is on to him though. Run Homer! Run!

Notice how Dr. Dread looks right at home in the environment. As a Level 3 Living Toon he possesses the details of a human, with the traits of a toon. Now take a look at Homer. He also looks at home in the image but also excites our imagination because he's a cartoon character. Combining multiple levels of Living Toons can produce some rather unique results.

Now that we've seen the very cool application of Living Toons, let's get started on making one. Since there is probably only one person on the planet who doesn't know Homer, I'll skip the biography. Instead, I'll touch on the elements we'll be adding to make him a Living Toon.

To make Homer a Living toon we need to add some human features to his existing design. We'll need to add human ears, eyes, nose and mouth. Of course, when we add these features we must also throw in some of the cartoon personality or we'll lose the original character. Figure 2 shows homer with the Living Toon features added.

You can see how Homer has taken on a whole new dimension, while maintaining his cartoon personality. The beauty of the Living Toon features is they open the door for more expression from the character. Homer is now capable of expressing all human emotions as well as cartoon expressions. Remember, a Living Toon isn't limited to our physics. Homer can completely deform his appearance, which makes for some very cool possibilities.

OK, that's enough prepping, let's get started with the fun stuff.

Modeling Homer

We'll be using the cube method to model Homer. Basically, we start with a simple cube, subdivide it a couple times and begin manipulating polygons. There are a number of ways we could model Homer, but the cube method makes the most sense because Homer's head is shaped like an egg, which is the foundation of cube modeling.

To begin the model, create a box 85cm tall, 45cm wide and 45cm deep. Now give it a surface named 'Skin' and set the color to RGB 255, 214, 13, which is Homer's skin tone. Now Subdivide/Metaform the object twice with a Max Smoothing Angle of 179. Then rotate the object -20 degrees on the 'X' axis. Finally, center the object along the 'X' axis and cut the model in half as shown in Figure 3.

Now we're ready to begin shaping the head. First, select the second row of points inward from the center axis and scale them to the same size as the first row as shown in Figure 4.

To shape the top of the head, select the upper three rows of polygons and drag the points to match the model in Figure 5.

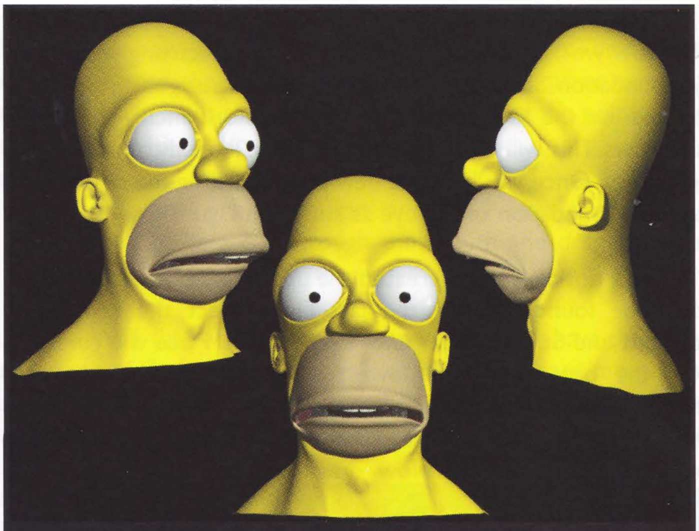
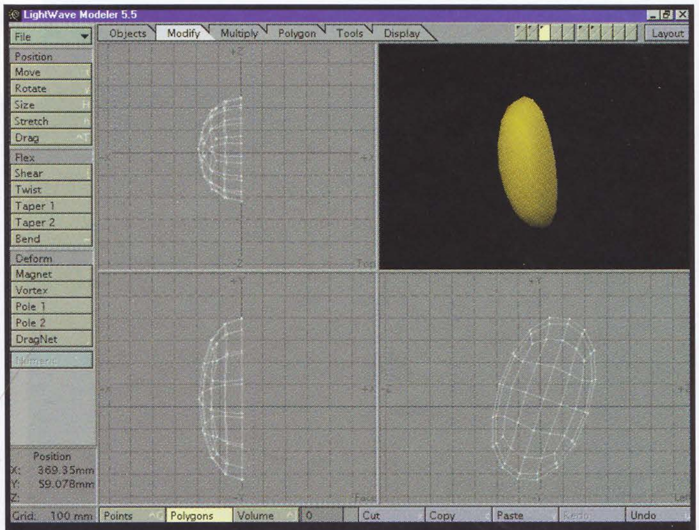


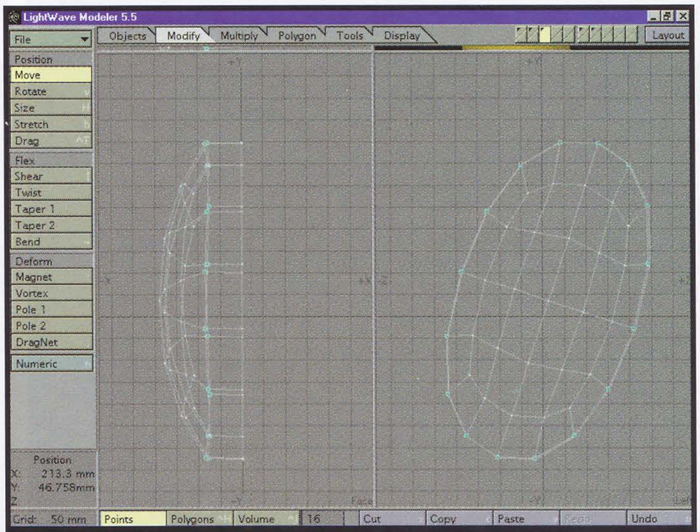
Figure 2 Living Toon Homer.



LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Numeric
Points
Polygons
Volume
Cut
Copy
Paste
Redo
Undo

Position
X: 369.35mm
Y: 59.078mm
Z:
Grid: 100 mm

Figure 3 The starting point.



LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Numeric
Points
Polygons
Volume
Cut
Copy
Paste
Redo
Undo

Position
X: 213.3 mm
Y: 46.758mm
Z:
Grid: 50 mm
16

Figure 4 Scaling the second row of points.

Now we'll work our way down the head, starting with the eye foundation. Select the 3rd and 4th row of polygons from the top and use the Knife tool to make a cut horizontally through both rows. This will create the polygons we'll need to make the eye socket. Once you have the new polygons, drag the points to build the foundation of the eye as shown in Figure 6.

You'll notice we also created the upper line of the jaw. Let's finish the foundation for the jaw. First, select the lower 8 polygons and Stretch them until they are flat. Place the cursor over the bottom of the lowest polygon when you begin stretching so they collapse downward. Then delete the polygons and use the Knife tool to make 2 cuts horizontally through the lower row of polygons. Now drag the points to form the foundation of the mouth and the beginning of the neck as shown in Figure 7.

To separate the jaw from the head, select the magnet tool and pull the side of the mouth inward from the front view like you see in Figure 8.

We're off to a good start. Now it's time to dive head first into creating the mouth, which is probably 50% of the work you'll do on the model.

Creating the Mouth, Throat and Neck

We'll start by shaping the base of the mouth so we can begin Smooth Shifting it. First, select and hide all of the polygons on the back of the head, behind the jaw. Now select the jaw polygons and drag them so they match Figure 19

With the mouth polygons selected, Smooth Shift them with an Offset of 0 and scale them up slightly, making sure you don't move them. You want the new polygons lined up with the parent polygon. Now assign a new surface name such as 'beard' and make the color RBG 213, 178, 122. This is the color of Homer's jaw.

Next, Smooth Shift the mouth polygons 2 times and scale them as shown in Figure 10.

Figure 5 Shaping the top of the head.

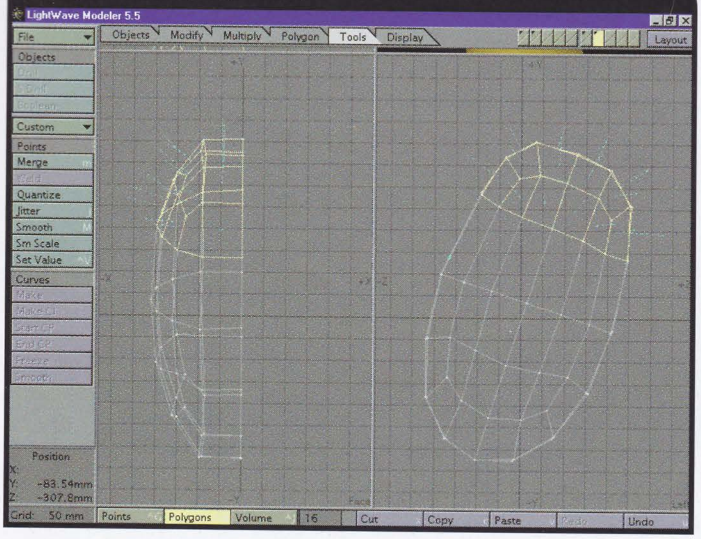

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Objects
Custom
Points
Merge
Quantize
Jitter
Smooth
Sm Scale
Set Value
Curves
Position
X:
Y: -83.54mm
Z: -307.8mm
Grid: 50 mm
Points
Polygons
Volume
16
Cut
Copy
Paste
Undo

Figure 6 Creating the eye foundation.

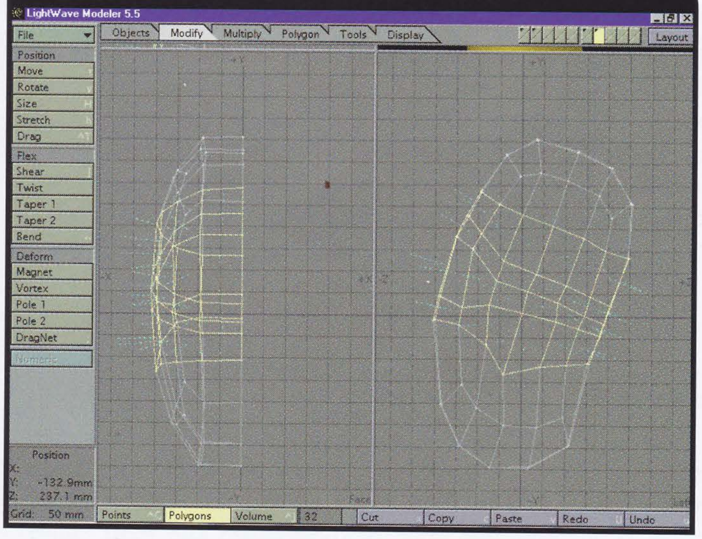

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Position
X:
Y: -132.9mm
Z: 237.1 mm
Grid: 50 mm
Points
Polygons
Volume
32
Cut
Copy
Paste
Redo
Undo

Figure 7 The foundation of the mouth.

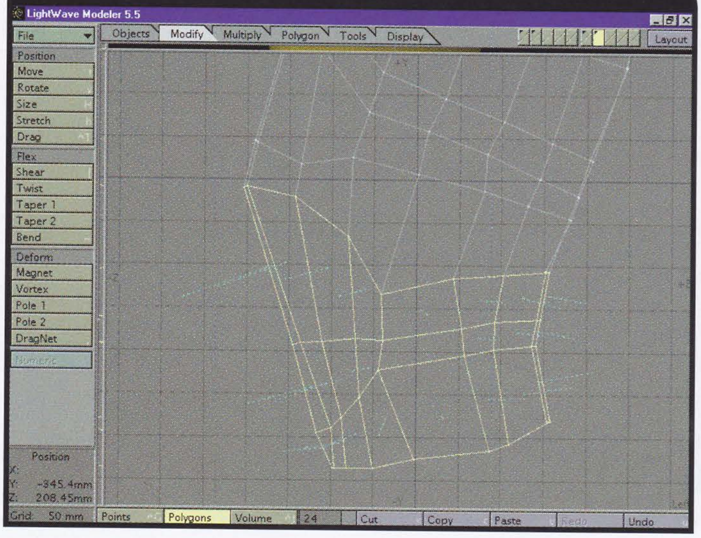
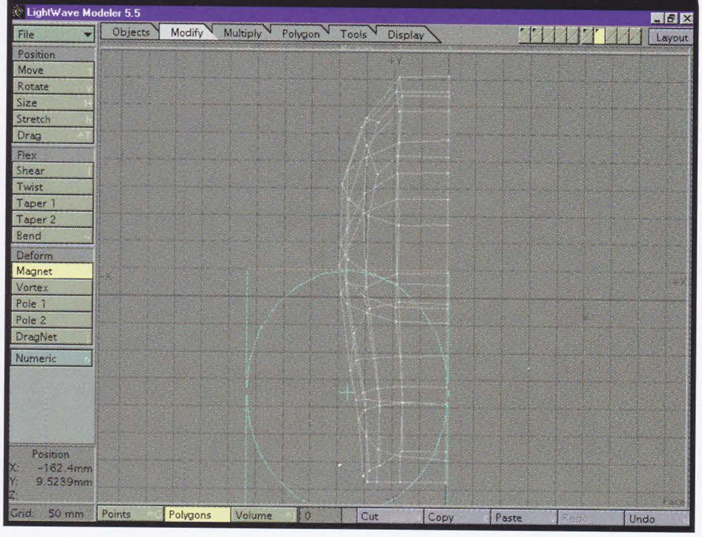

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Position
X:
Y: -345.4mm
Z: 208.45mm
Grid: 50 mm
Points
Polygons
Volume
24
Cut
Copy
Paste
Undo

Figure 8 Pulling the mouth inward.


LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Numeric
Position
X: -162.4mm
Y: 9.5239mm
Z:
Grid: 50 mm
Points
Polygons
Volume
0
Cut
Copy
Paste
Undo

Then delete the polygons that were created along the 'X' axis. Now comes the tricky part. We'll be using the Knife tool to cut the lips out of the mouth. It can get confusing so be sure to compare the images to see the changes that were made. I'll start by showing you where to make the cut, then I'll show you where to drag the points. OK, let's get started.

Make a cut through the mouth as shown in Figure 11.

Now drag the points as shown on the right of Figure 11. When you are working with the knife tool you'll find that you often need to weld points. You should always try to place the cutting line directly over a point but it doesn't always cut to the point. Sometimes it will create another point right next to it. This is easy to check. Just select the point and see if it shows multiple points in the information window. If it does, just weld the points.

We'll need to make a few more cuts so we can create the lips. Make a cut through the mouth and drag the points shown in Figure 12.

9 Shaping the foundation of the mouth.

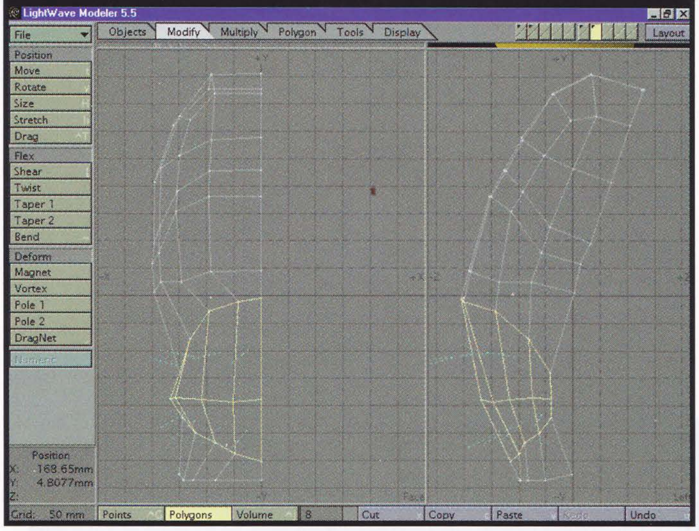
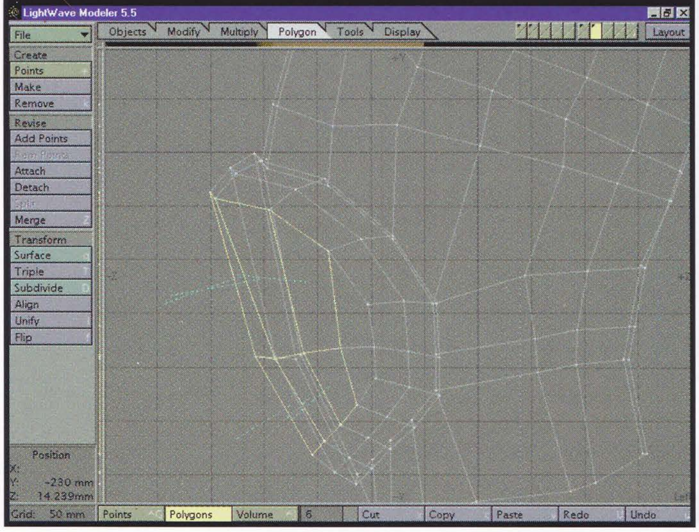

LightWave Modeler 5.5
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
File
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Position
X: 168.65mm
Y: 4.8077mm
Z:
Grid: 50 mm
Points
Polygons
Volume
8
Cut
Copy
Paste
Redo
Undo

Figure 10 Creating the jaw Figure.


LightWave Modeler 5.5
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
File
Create
Points
Make
Remove
Revise
Add Points
Attach
Detach
Merge
Transform
Surface
Triple
Subdivide
Align
Unify
Flip
Position
X:
Y: -230 mm
Z: 14.239mm
Grid: 50 mm
Points
Polygons
Volume
6
Cut
Copy
Paste
Redo
Undo

We now have the polygons for the upper lip. The next step is to create the lower lip polygons, which requires two more cuts. Make a cut through the mouth and drag the points shown in Figure 13.

OK, just one more cut and we'll have the lower lip polygons. Make a cut through the mouth and drag the points shown in Figure 14.

Well, that was a bit of a chore but now we have the general shape of the mouth. Now we'll work on the inner mouth. First, select the polygons between the lips and Smooth Shift them back with a Max Smoothing Angle of 0, stretching them

Figure 11 Cutting the jaw.

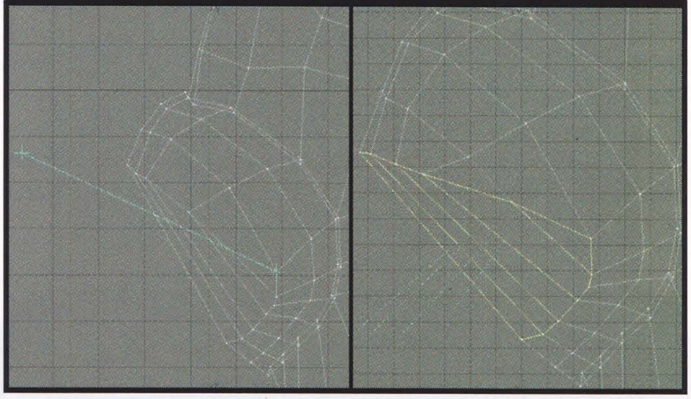


Figure 12 Creating the upper lip polygons.

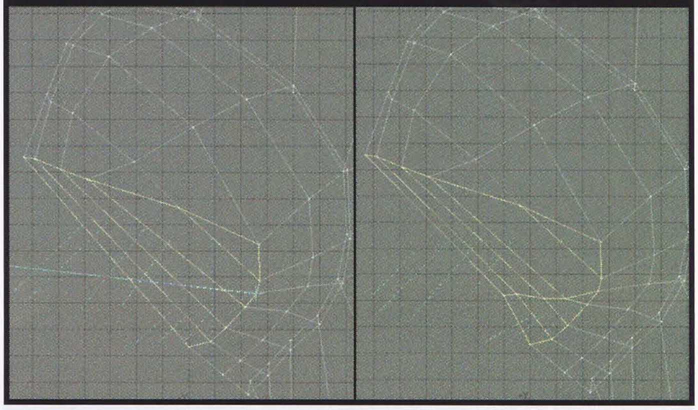
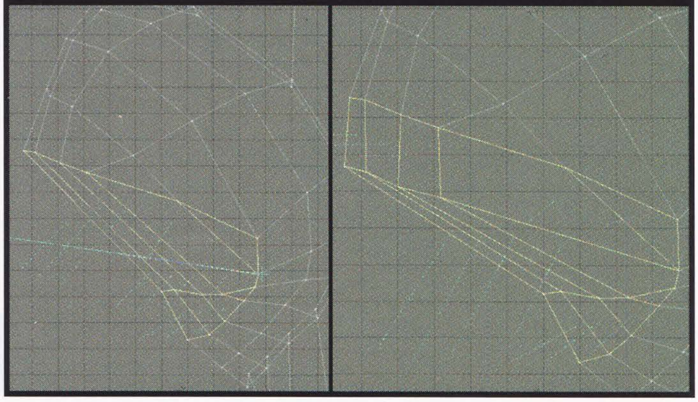


Figure 13 Building the lower jaw.



backward and inward to create the thickness of the lips as shown in Figure 15.

For future reference, you should always use a Max Smoothing Angle of 0 when Smooth Shifting polygons to avoid potential errors. You are much better off manually moving and sizing them after they've been shifted.

Before we create the back of the lips, assign the polygons a new surface called "mouth" and set the color to RGB 180, 103, 103. Now Smooth Shift these polygons back , stretching them backward and inward to taper the back of the lip. You'll also need to stretch them vertically to create the recession behind the lips as shown in Figure 16.

Now it's time for some easy work. We need to create the inner mouth and throat by performing a number of Smooth Shifts. Go ahead and create your inner mouth by Smooth Shifting the polygons into the head, scaling and rotating them as you go until you have something resembling Figure 17.

Be sure to delete the polygons along the 'X' axis. Great, now we have the jaw and inner mouth completed. The last detail on the mouth will be the lips.

Figure 14 Creating the lower lip polygons.

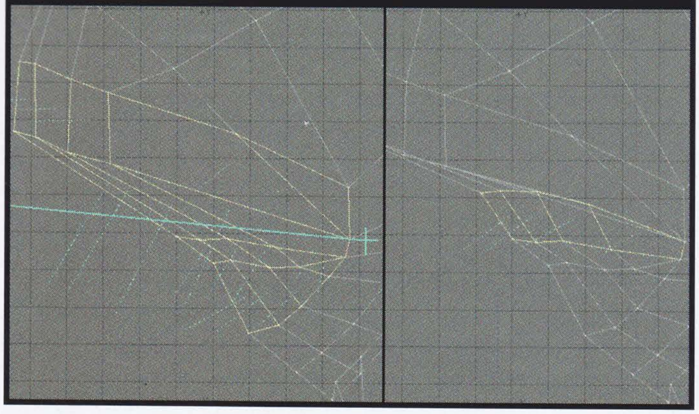
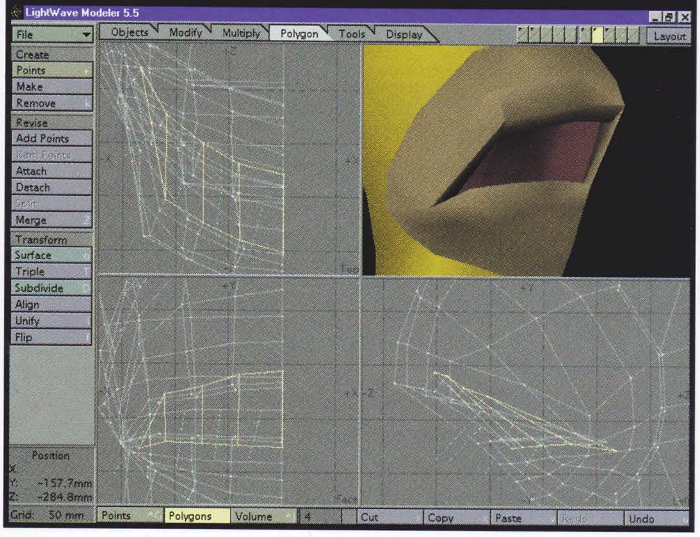


Figure 16 Creating the back of the lips.


LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Create
Points
Make
Remove
Revise
Add Points
Rem Points
Attach
Detach
Split
Merge
Transform
Surface
Triple
Subdivide
Align
Unify
Flip
Position
X:
Y: -157.7mm
Z: -284.8mm
Grid: 50 mm
Points
Polygons
Volume
4
Cut
Copy
Paste
Redo
Undo

First select the mouth polygons and hide them so can get a better view of the lips. Then select the polygons along the upper lip and Smooth Shift them. Then bring them forward and drag the upper row points so there is a slope on the top of the lip. Be sure you don't select the polygons on the bottom or back of the lip. You just want the polygons along the front to be Smooth Shifted. Now repeat the same process for the lower lip and delete the polygons along the 'X' axis. You should have something like Figure 18.

To add some character to the mouth we'll create a fold of skin at the corner of the jaw. First we'll need to create some new polygons. Select the three polygons on the side of the jaw, behind the upper lip and split them with the Knife tool as shown in Figure 19.

Now Select the four polygons just behind the corner of the mouth and Smooth Shift them. Move them out and away from the jaw, then forward as shown in Figure 20.

Figure 15 Adding depth to the lips.

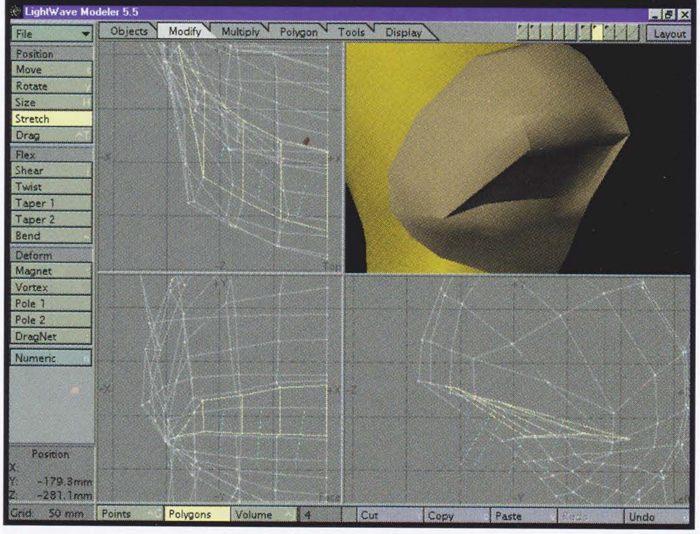
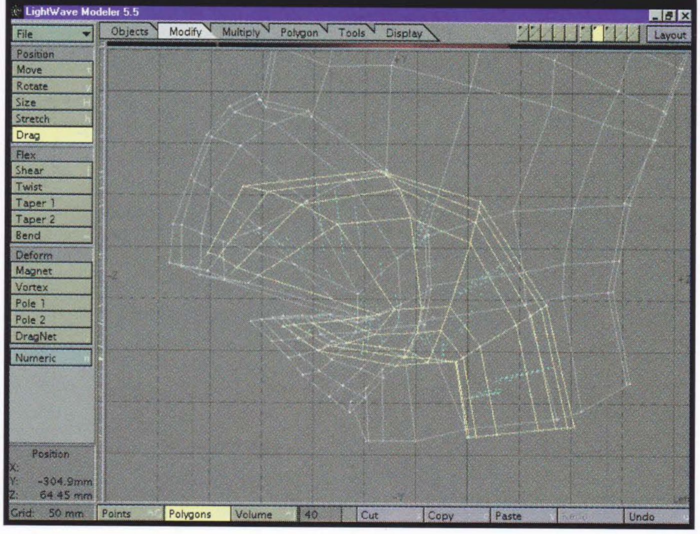

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Numeric
Position
X:
Y: -179.3mm
Z: -281.1mm
Grid: 50 mm
Points
Polygons
Volume
4
Cut
Copy
Paste
Redo
Undo

Figure 17 The completed inner mouth and throat.


LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Numeric
Position
X:
Y: -304.9mm
Z: 64.45 mm
Grid: 50 mm
Points
Polygons
Volume
40
Cut
Copy
Paste
Redo
Undo

You should also rotate them outward slightly to make the skin fold a bit wider.

We're starting to see the model come together now. Let's finish off the lower part of the model by completing the neck, then we'll work on the eyes, nose and ears.

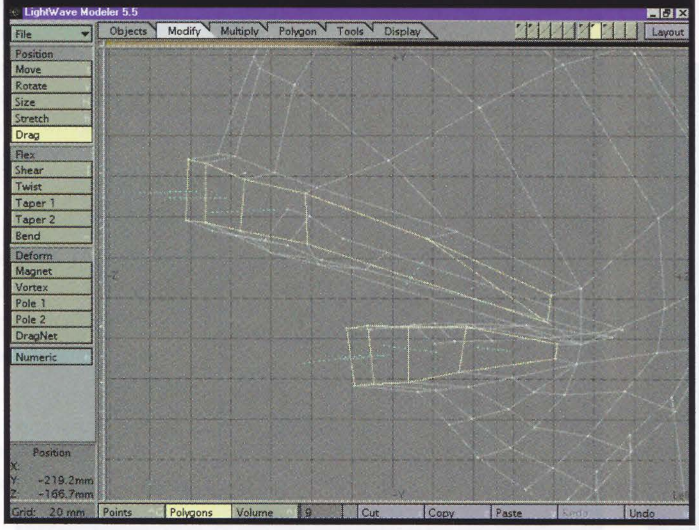
Select all of the points on the bottom of the neck, copy and paste them to a new layer, and make a new polygon by selecting them in series and pressing the 'p' key. Now assign them the 'skin' surface. We're going to Smooth Shift this polygon to make the neck, but first we need to attach it to the model. Cut the polygon and paste it in the layer with your model. Then Merge points by pressing the 'm' key. Now we can start creating the neck.

Select the polygon you just created and Smooth Shift it twice, stretching it to the left and dragging the points each time until you have a neck as shown in Figure 21.

Now delete the polygon at the bottom of the neck. The next step is to create the Adam's Apple. To do this, select the two polygons below the chin, directly up from the bottom and Smooth Shift them out, scaling them down to create the rounded Adam's Apple. Now drag the points around these polygons until they resemble Figure 22 and delete the polygons along the 'X' axis.

Now for a final touch, you can select the points on either side of the adam's apple and drag them forward and inward to create the neck tendons. We should also add a fold of skin behind the jaw to give Homer a little more personality. Of course, this will require making new polygons.

Figure 18 Creating the lips.


LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Numeric
Position
X:
Y: -219.2mm
Z: -166.7mm
Grid: 20 mm
Points
Polygons
Volume
9
Cut
Copy
Paste
Redo
Undo

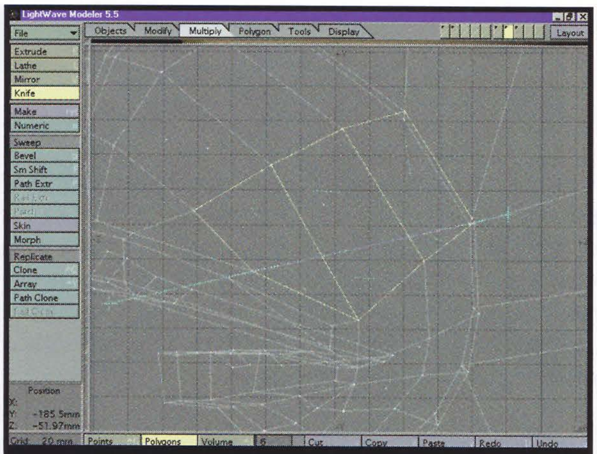

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Extrude
Lathe
Mirror
Knife
Make
Numeric
Sweep
Bevel
Sm Shift
Path Extr
Skin
Morph
Replicate
Clone
Array
Path Clone
Position
X:
Y: -185.5mm
Z: -51.97mm
Grid: 20 mm
Points
Polygons
Volume
Cut
Copy
Paste
Redo
Undo

Figure 19 Creating the polygons for the skin fold.

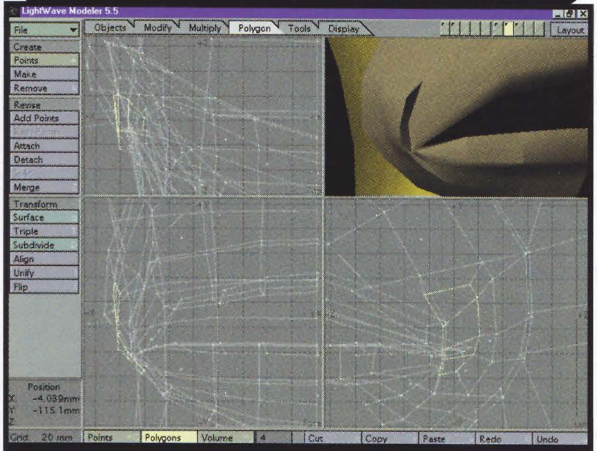

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Create
Points
Make
Remove
Revise
Add Points
Attach
Detach
Merge
Transform
Surface
Triple
Subdivide
Align
Unify
Flip
Position
X: -4.039mm
Y: -115.1mm
Z:
Grid: 20 mm
Points
Polygons
Volume
4
Cut
Copy
Paste
Redo
Undo

Figure 20 Creating the skin fold behind the mouth.

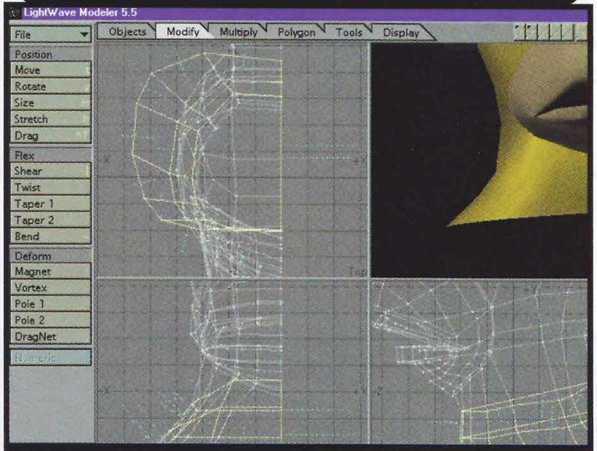

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Numeric

Figure 21 The neck.

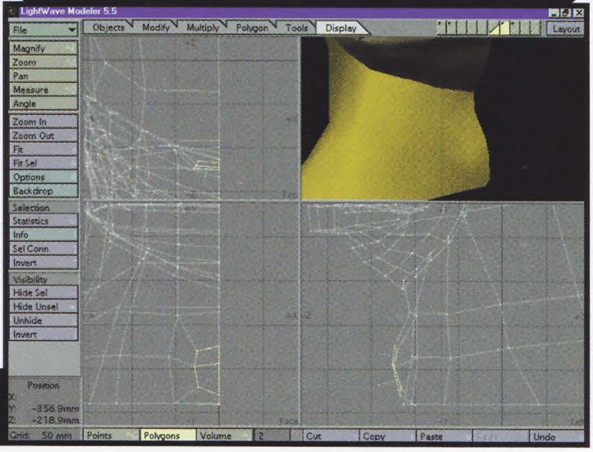

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Magnify
Zoom
Pan
Measure
Angle
Zoom In
Zoom Out
Fit
Fit Sel
Options
Backdrop
Selection
Statistics
Info
Sel Conn
Invert
Visibility
Hide Sel
Hide Unsel
Unhide
Invert
Position
X:
Y: -356.9mm
Z: -218.9mm
Grid: 50 mm
Points
Polygons
Volume
2
Cut
Copy
Paste
Undo

Figure 22 The Adam's Apple.

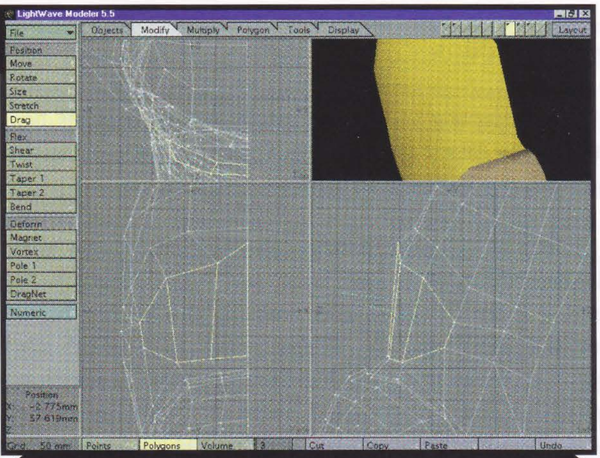


Figure 24 Shaping the base of the nose.

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Numeric
Position
Y: -2.775mm
Z: 57.619mm
Grid: 50 mm
Points
Polygons
Volume
Cut
Copy
Paste
Undo

First, select the ring of polygons just behind the jaw. Now drag the first two points on the top downward toward the jaw. Then, with the Add Point tool, place points on the polygons selected, around the jaw to the bottom to create a thin ring of polygons behind the jaw. Finally, select the 4 polygons just behind the jaw and pull their points closest to the jaw outward as shown in Figure 23.

This will create a very nice fold of skin behind the jaw when you metaform the model. It's always a good idea to add some fleshy skin to your Living Toons to help bring them to life.

Creating the Nose

OK, now we're ready for the nose and eyes. We'll start with the nose first since it lays the foundation for the eyes. To begin, we'll need to move the polygons into place for the nose. Select the three polygons above the mouth and drag the points until your model matches Figure 24.

Now we need to cut the polygons in two so we have more polygons to make the nose. Use the knife tool to slice the polygons horizontally and then drag the points so they match Figure 25.

Alright, now we can start building the nose. We'll begin by selecting the three polygons that make up the nose and Smooth Shift them forward, dragging the points to match Figure 26.

Now select the lower two polygons of the nose and Smooth Shift them forward three times, scaling them down each time. Use Figure 27 as a guide.

Figure 23 Creating a fold of skin behind the nose.

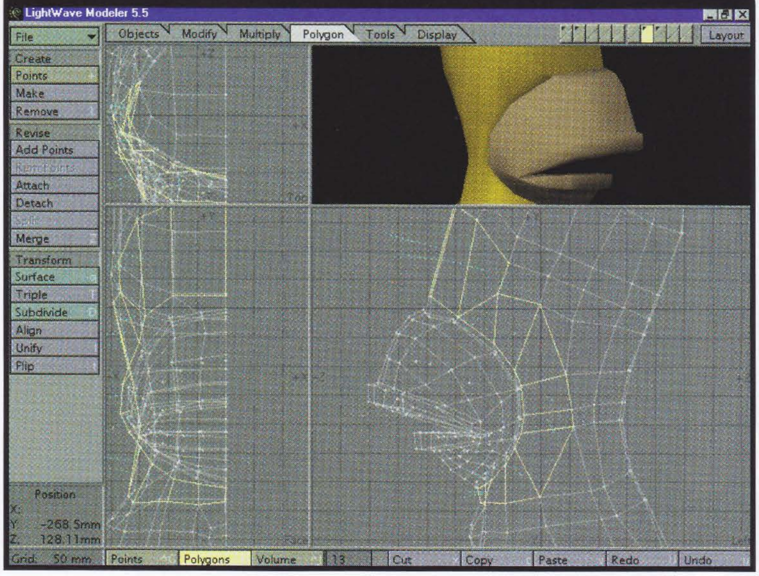

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Create
Points
Make
Remove
Revise
Add Points
Attach
Detach
Merge
Transform
Surface
Triple
Subdivide
Align
Unify
Flip
Position
X:
Y: -268.5mm
Z: 128.11mm
Grid: 50 mm
Points
Polygons
Volume
13
Cut
Copy
Paste
Redo
Undo

Figure 25 (below) Splitting the polygons

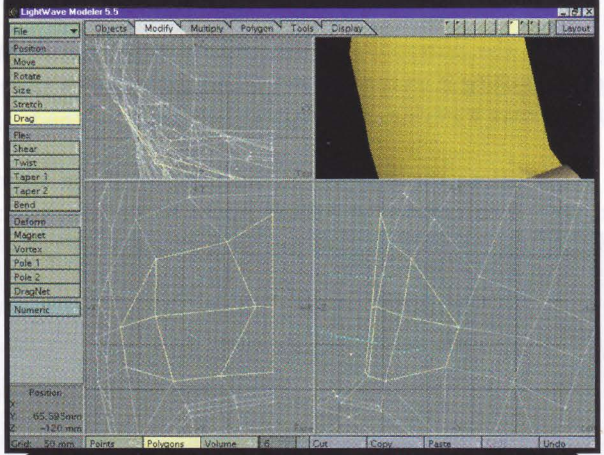

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Numeric
Position
Y: 65.595mm
Z: -120 mm
Grid: 50 mm
Points
Polygons
Volume
6
Cut
Copy
Paste
Undo

Figure 26 (below) Creating the nose.

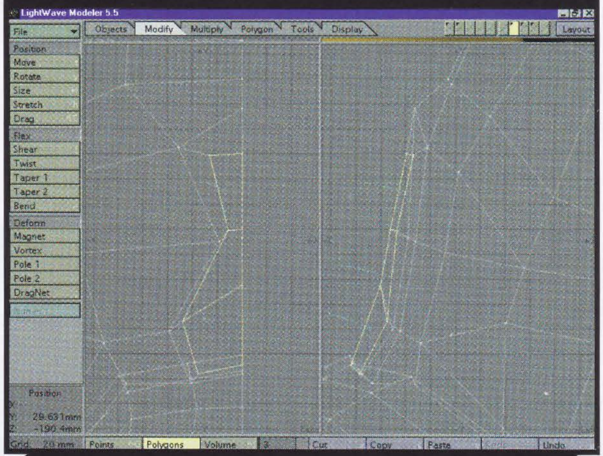
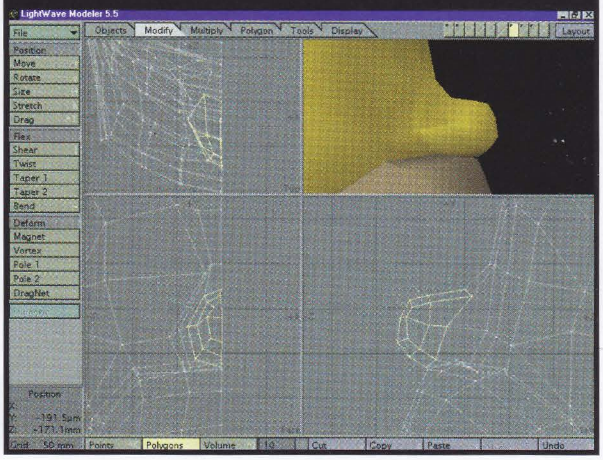

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Position
Y: 29.631mm
Z: -190.4mm
Grid: 20 mm
Points
Polygons
Volume
3
Cut
Copy
Paste
Undo

Figure 27 (below) Creating the end of the nose.


LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Position
Y: -191.5μm
Z: -171.1mm
Grid: 50 mm
Points
Polygons
Volume
10
Cut
Copy
Paste
Undo

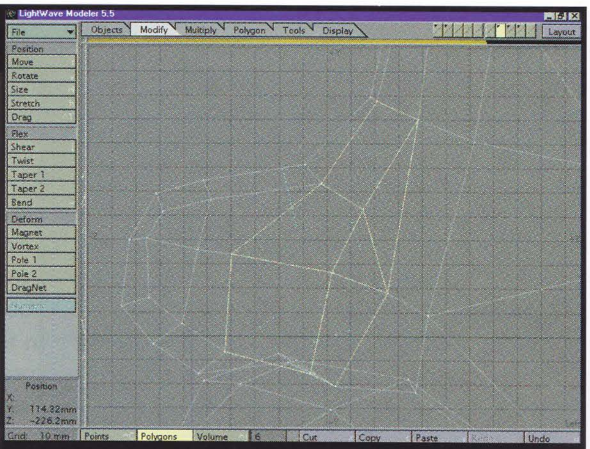


Figure 28 Making the nostril base.

It's time for a little tricky work. We need to make the nostril, which will require more polygons. Select the four polygons on the lower outside of the nose. Using the Add Point tool, add a point between the upper two polygons and then select the point and split the polygons as shown in Figure 28.

You'll need to drag the points a bit so they match Figure 1.28. OK, now it's time to add depth to the nostril. Select the four nostril polygons and Smooth Shift them out two times, scaling them. You should now have a nostril like the one in Figure 29.

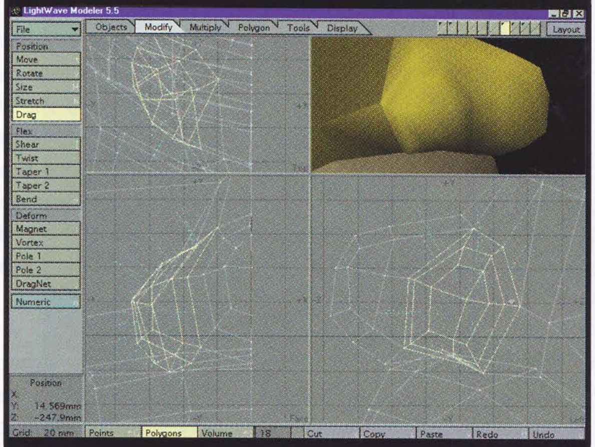


Figure 29 (above) The nostril.

There's just one element remaining on the nose, the actual nostril hole. This is easy to create but you'll need to hide the beard polygons so you can gain access to the underside of the nose. One you've hidden the beard, select the four polygons directly under the nose and Smooth Shift them once as shown in Figure 30.

Don't actually move the new polygons. Just scale them and drag the points to match Figure 29. Now Smooth Shift the polygons two times into the nose, scaling them each time to create a nostril. Then click on unhide to show the complete model.

The next step is to create the eyes. These are probably the easiest part of the model to make, so I save them for last. It's usually a bad idea to tackle the most complicated aspects last since you'll probably be fairly burnt before you even get to it. It's better to tackle the tough jobs when you have the energy.

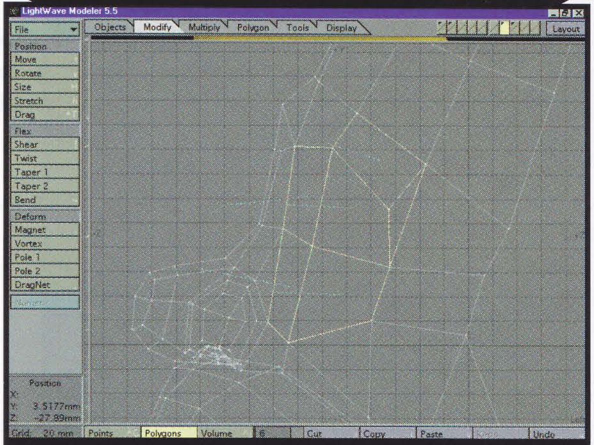


Figure 30 (above) Starting the nostril. Making a round eye socket base.

Modeling the Eye Sockets

When creating the eye, we'll want to start with a relatively round shape, so we need to edit the current eye socket polygons. Select the 4 polygons next to the nose and the one in the upper left corner of the eye. From your side view, add a point to the middle of the 3 point polygon on the top. This is between the two polygons. Now select the points and split the 5 point polygon as shown in Figure 30.

Now we need to remove the tension on the back of the eye. To do so we need to eliminate the tight 3 point polygon. Select the two polygons directly behind the eye, which includes the tight 3 point polygon, and press 'k' to kill the polygons. Now select the points and create the new polygons shown in Figure 31.

Be sure to assign the 'skin' surface to the new polygons so they don't carry the mouth surface. The next step is to shape the eye socket and create the polygons we'll use to make the eyelids.

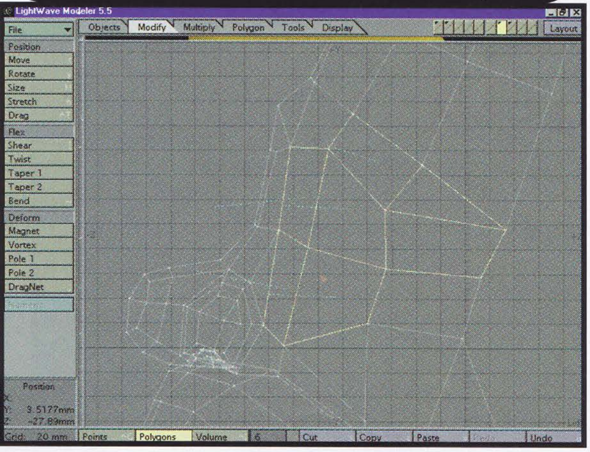


Figure 31 Removing the eye tension.

Select the four eye socket polygons and Smooth Shift them, scaling them slightly. Position the polygons in alignment with the parent polygon and then drag the points so your eye socket matches Figure 32.

To make our eye socket work we'll need to have an eye to mold it around. Create a sphere with the default settings on a new layer, scale it to the size of the socket and position it over the eye socket. Now select the four narrow polygons just above the eye socket and Smooth Shift them forward. Hold down the Shift key and activate the eye layer so they are both on screen. Then drag the polygons until they wrap around the eye as seen in Figure 33.

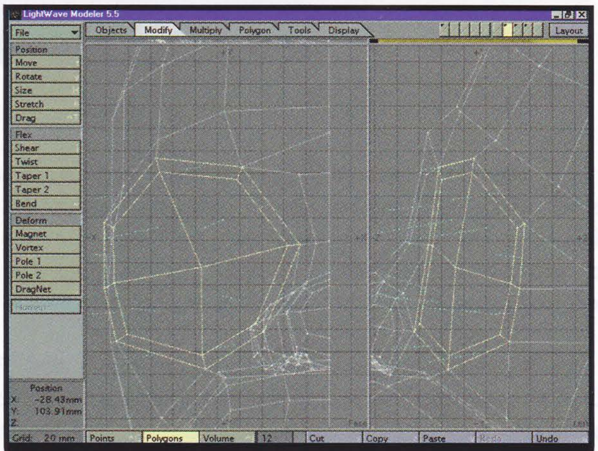

LightWave Modeler 5.5
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
X: -28.43mm
Y: 103.91mm
Grid: 20 mm
Points
Polygons
Volume
Cut
Copy
Paste
Undo

Figure 32 Shaping the eye socket.

Now do the same for the lower eyelid. Then Smooth Shift the upper eyelid one more time to close the gap. To prevent the eyelids from becoming razor sharp, when we Metaform, we need to add a small row of polygons just past the end of the eyelid. Simply Smooth Shift the eyelid polygons one more time and move them just past the other polygons. Then drag the points to make the last layer of polygons slightly smaller. This will create a smooth, rounded edge to the eyelids. You should now have something similar to Figure 34.

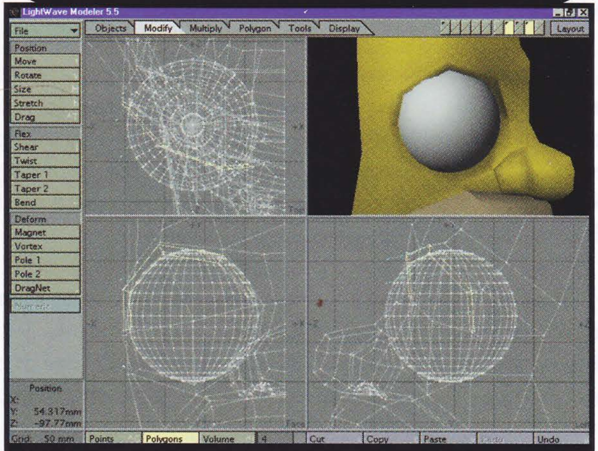

LightWave Modeler 5.5
Position
Y: 54.317mm
Z: -97.77mm
Grid: 50 mm

Figure 33 Making the upper eyelid.

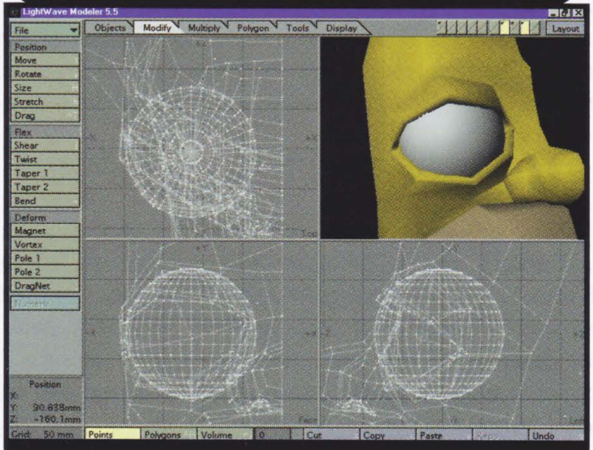

LightWave Modeler 5.5
Position
Y: 90.638mm
Z: -160.1mm
Grid: 50 mm

Figure 34 The completed eyelids.

Now we're ready for the eyebrow ridge. Before we create the ridge we need to split a polygon so we can create the proper shape. In Figure 35, you'll see the polygon that needs to be split.

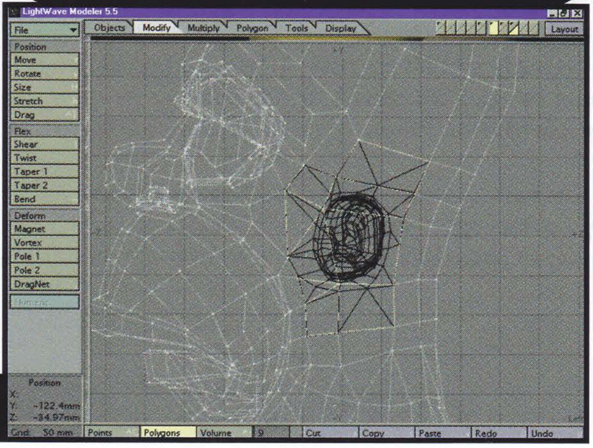

LightWave Modeler 5.5
Position
Y: -122.4mm
Z: -34.97mm
Grid: 50 mm

Figure 35 Splitting the polygon.

OK, now select all of the polygons surrounding the top portion of the eye and Smooth Shift them. Then drag the points until you have an eyebrow ridge similar to the one in Figure 36.

It will take a bit of tweaking to achieve the right shape but it won't take more than a few minutes.

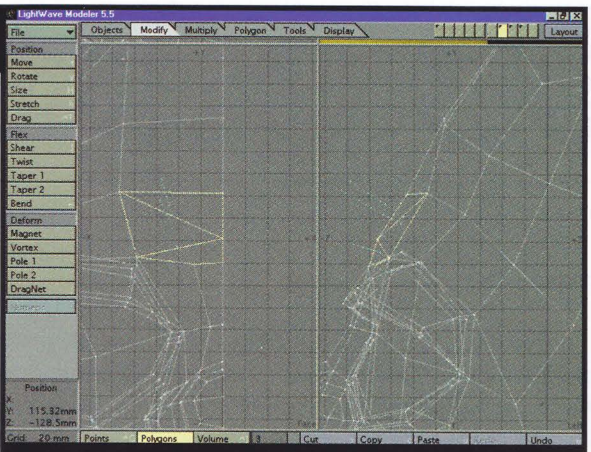
Well, the only thing left to add is the ear, so let's do it.

Attaching the Ear

This is the easiest part of the model because I've provided the ear for you. Now would be a good time to download the #2lightwave.zip file from the support folder on the Serious 3D site. It contains the ear and a completed model of Homer's head. Once you have the ear model extracted, load it into a separate layer.

The ear was designed to plug into the Homer head without much work. What you need to do is move to the Homer head layer and select the ear layer as a background layer. Then drag the points on the side of the Homer's head until they match the points on the ear. It should require only a bit of tweaking. You might have to scale the ear a bit but not much. When finished, you should see something similar to Figure 37.

Figure 36 The eyebrow ridge.


LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Position
Move
Rotate
Size
Stretch
Drag
Flex
Shear
Twist
Taper 1
Taper 2
Bend
Deform
Magnet
Vortex
Pole 1
Pole 2
DragNet
Grid 20 mm
Points
Polygons
Volume
Cut
Copy
Paste
Undo

Now delete the polygons within the points and press the quotation key to switch to the ear layer. Then cut the ear and paste it in the Homer head layer. Now select the points around the seam between the two objects and press the 'm' key to merge the points. When the Merge Points panel pops-up select Absolute and set the value to 25mm. This will merge all of the points on the seam. You might need to set the value higher to get all of the points to merge.

When you are finished you should have a head like the one in Figure 38

Well, that does it! We're finished with Homer's head. Well, not quite finished. The last step is to cut the eye and paste it in the head layer. Then you need to select all of the points along the 'X' axis, press 'CTRL+V', set the Value to 0 and press enter. Now all of the points are aligned so we can mirror the mesh.

Press "SHIFT+V" to select Mirror and then press 'n' to pop up the numeric requester. Select the 'X' axis, set the Position to 0 and press Enter. Now press 'm' to merge the points. Be sure to set it back to automatic or you'll end up merging points within the head. When you're done, press 'SHIFT+D' to open the subdivision panel. Select Metaform, set the Max Smoothing Angle to 179 and press Enter.

You now have a high-resolution model of Homer Simpsons head, much like the one in Figure 39.

Well, now we are finished! While it was a bit of work to model Homer's head, the results are very cool. Homer has come to life. Of course, there's always room for a little tweaking to reach perfection, but that's the fun part.

Wrap Up

As you can see, creating a Living Toon is both challenging and rewarding. In the case of Homer, we skipped the surfacing portion because, well, he's a Level 1 Living Toon. If you wanted to make Homer a little more appealing, you could add some fractal noise to the surface in Layout to break up the light. It will help to make home appear softer.

Now that you know everything there is to know about Living Toons you can start bringing all of your favorite cartoon characters to life in 3D. Be sure to send me renders of your Living Toons, I'd love to see them.

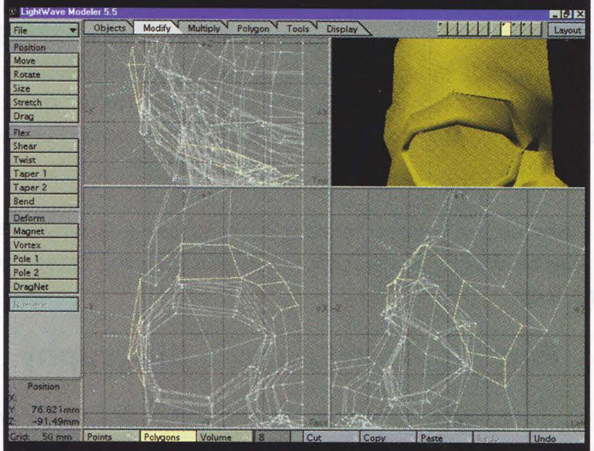

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Grid 50 mm
Points
Polygons
Volume
Cut
Copy
Paste
Undo

Figure 37 The head points aligned with the ear points.

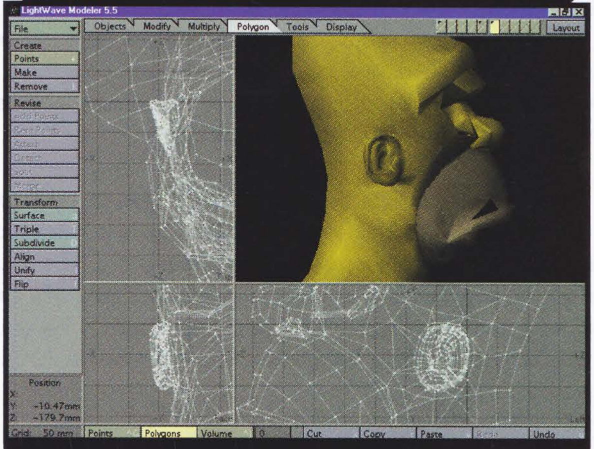

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Create
Points
Make
Remove
Revise
Transform
Surface
Triple
Subdivide
Align
Unify
Flip
Grid 50 mm
Points
Polygons
Volume
Cut
Copy
Paste
Undo

Figure 38 The ear attached.

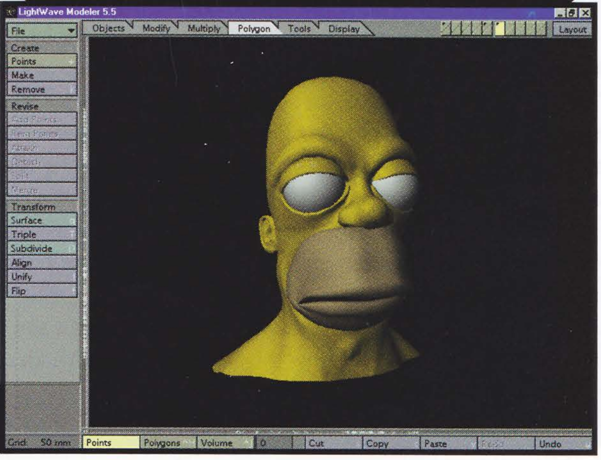

LightWave Modeler 5.5
File
Objects
Modify
Multiply
Polygon
Tools
Display
Layout
Create
Points
Make
Remove
Revise
Transform
Surface
Triple
Subdivide
Align
Unify
Flip
Grid 50 mm
Points
Polygons
Volume
Cut
Copy
Paste
Undo

Figure 39 The completed model.

3D Studio Max

Living Toon Modeling

By Shane Olson

In this tutorial, we will be using a fairly new plugin for 3D Studio MAX called Surface Tools to model a bipedal human type character named Sam Jones. We will only be modeling the head due to the confines of the space.

First we will explore what makes Sam Jones a Living Toon, followed by a brief cover of the plugin. Then we will dive right in and model Sam's head! We will be moving rather quickly, so refer to the figures frequently to gain a better understanding of the process.

Now, let's see what makes this old farmer tick, why he looks the way he does, and what makes him fit into the category of a Living Toon.

Farmer Sam Jones, a biography

Living Toons are very fun and exciting to model. When modeling a Living Toon, you need to consider what makes the character a living toon in the first place. By far the most prominent and noticeable way to distinguish a living toon is by the exaggerated and simplified features. You're right, some old people have huge ears, and huge noses, and some of them even look like cartoons, so the gap between real elderly people and Living Toons is rather small, but it's still there.

Take Farmer Sam Jones for example. If you study Figure 1, you will notice that this drawing could be a portrait of an elderly person, but there are a few differences. The head is smaller, the forehead is almost gone, the brows are huge and his nose, ears and chin have all been exaggerated. Now that we know what makes him a living toon, lets examine why he looks the way he does.

Farmer Sam Jones: Occupation… you guessed it… Farmer!

Farmer Jones is a man who has been there! Seen it! Done it! And it shows! Old Sam has worked very hard all of his life. He's always up with the Roosters. He then spends his entire day working in the hot sun, plowing fields and milking cows. This has given Farmer Sam a deep rich "farmer" tan. His face is weathered by the years he has spent outside in the elements. He has a slight crook in his back from years of lifting heavy bails of hay and heavy farm equipment. His teeth are missing from lack of dental care (and old age). His eyes are beady specks from squinting in the sun so long. You can almost count the rings under his eyes like the rings on an oak tree to figure out how old he is.

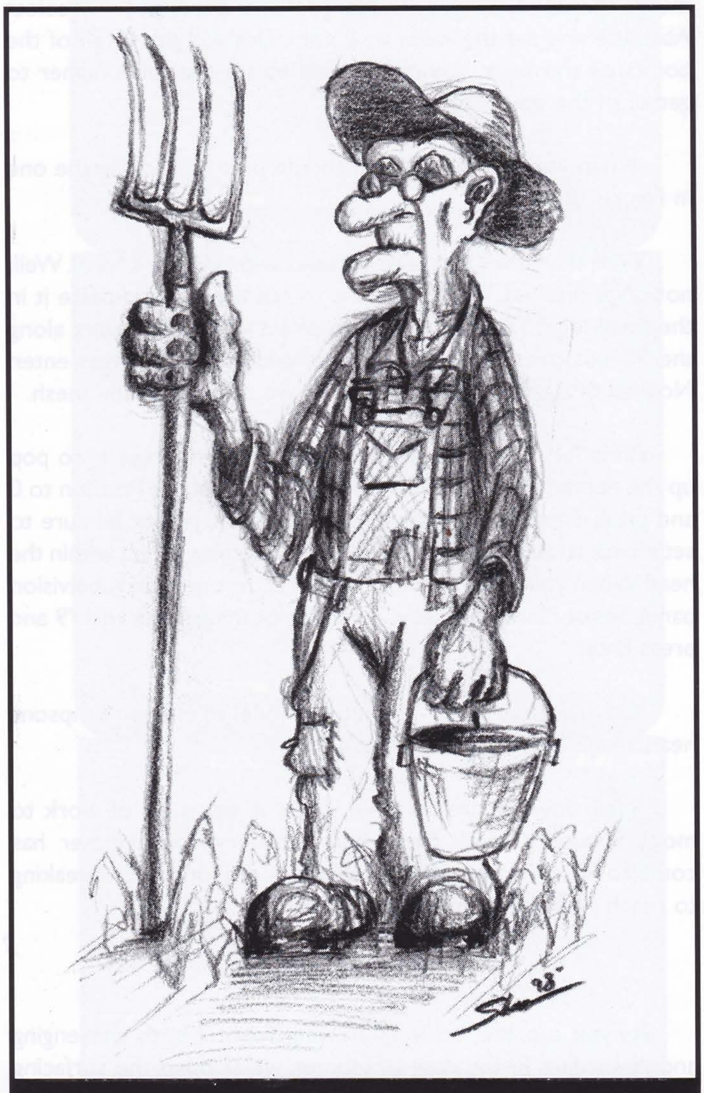


Figure 1 Farmer Sam Jones Concept Drawing.

We won't be concerned about his attire in this tutorial but we will need to explore this as well. Sam almost always wears the same thing every day…a pair of overalls, a flannel shirt and heavy work boots covered with who knows what.

Well, that's about all we need to get started on creating our concept sketches and then we'll move right into modeling this funny old man.

Surface Tools Overview

SurfaceTools is a 3rd Party Plug-In developed by Peter Watje for Digimation. You can purchase Surfacetools for around $95 U.S. dollars by visiting www.digimation.com.

SurfaceTools has two vital features. The first is called Cross Section. This tool behaves much like Skinning in other 3D programs. It connects the points (vertices) in a series of splines or cross sections to create a complete spline wireframe of your object. We will not be using this tool much while modeling the face — it's better suited for creating other objects such as clothing and appendages. We will be covering this tool in depth in the "Modeling 3D living Toons" book.

The second feature is called Surface. Surface allows you to convert any set of splines that make up a three, or four-sided frame of splines into either a Quad-Patch or a Tri-Patch. We will be using this tool extensively throughout this tutorial.

For a sample of how SurfaceTools works, take a look at Figure 1. On the left, you will notice two sets of splines creating both triangular and square shaped areas. On the right, the Surface modifier has been applied to each set of splines causing them to become patches of polygons.

Notice that where the splines do not make an enclosed area, the Surface modifier does not work. Keep this in mind while modeling. Also, the vertices need to be directly on top of one another where they intersect, but they do not need to be welded! The best way to accomplish this is by using the new 3D Snap tool in 3D Studio MAX Release 2. To make the best use out of this feature, you must change the default settings of the snap function by going to Views/Grids and Snap Settings, then change the value to Vertex instead of Grid Points as shown in figure 3.

With the knowledge of this newfound tool under your belt, lets get modeling.

Modeling the Head

To model the head, it would be a lot easier if we had a template to work from. Start by drawing a side profile of the head out of splines in the left or right viewport as shown in Figure 4. The drawing doesn't need to be perfect. You will be changing and tweaking it as you go along. Attach all of the splines together using the Attach button. Instead of creating lines from the Create Panel, from here on out you can create splines from within the Modifier stack at the Spline level. To do this, first select a spline, then click the Modify button. Make sure that the Sub-object button is turned off. Now click on Create Line. This way you can create splines that are already part of the same object instead of attaching a bunch of single splines later. We can now use this group of splines as a base to work from.

We only need to model half of the head because we will mirror the other half later. So think of your newly created splines as the center of the head. The next step is to make this head three-dimensional. To do this, in the front viewport, start to pull the vertices outward to create depth as shown in Figure 5.

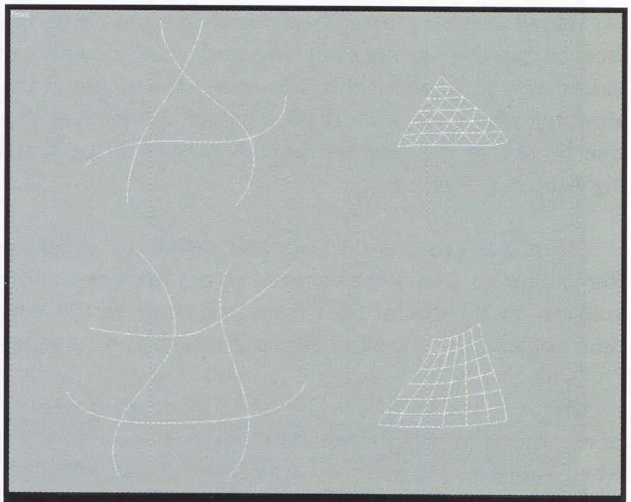
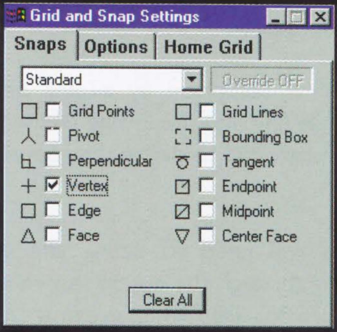


Figure 2 SurfaceTools Sample.



Standard

☐ Grid Points
☐ Pivot
☐ Perpendicular
☑ Vertex
☐ Edge
☐ Face
☐ Grid Lines
☐ Bounding Box
☐ Tangent
☐ Endpoint
☐ Midpoint
☐ Center Face

Figure 3 Changing the Snap Settings.

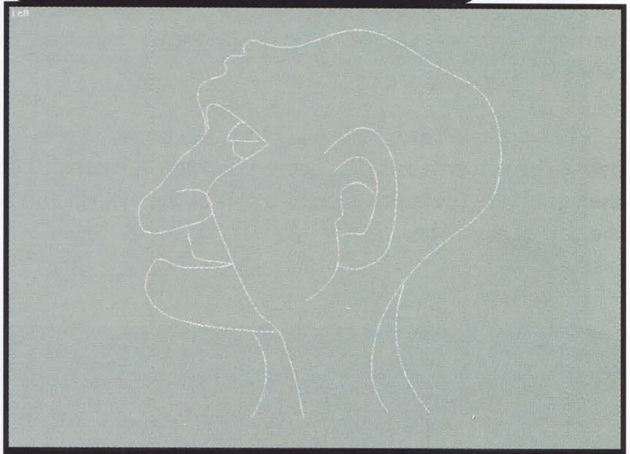


Figure 4 Side Profile made from Splines.

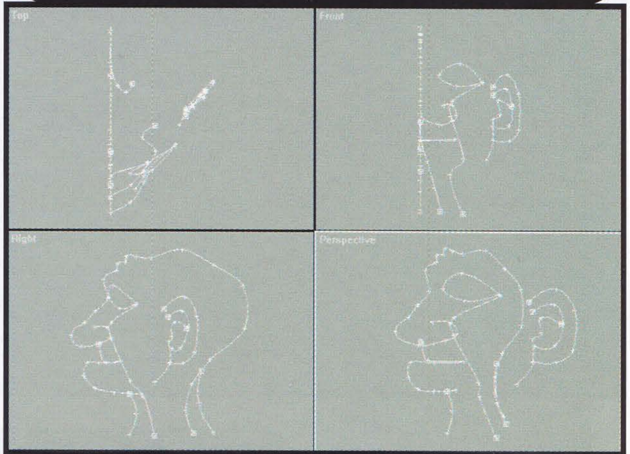


Figure 5 Pulling Out the Vertices.

Now start to create lines that define the contour of the face by starting up near the eye and going downwards. The easiest way to go about this is to create the splines in the front viewport where you want them, then pull the vertices into place one by one in the side viewport. A sample of the first line is highlighted in Figure 6.

Continue creating the lines that define the cheek and jaw. Remember to create the vertices across from one another so you can lay horizontal lines from vertex to vertex when the time comes. Take a look at Figure 7 to use as a reference.

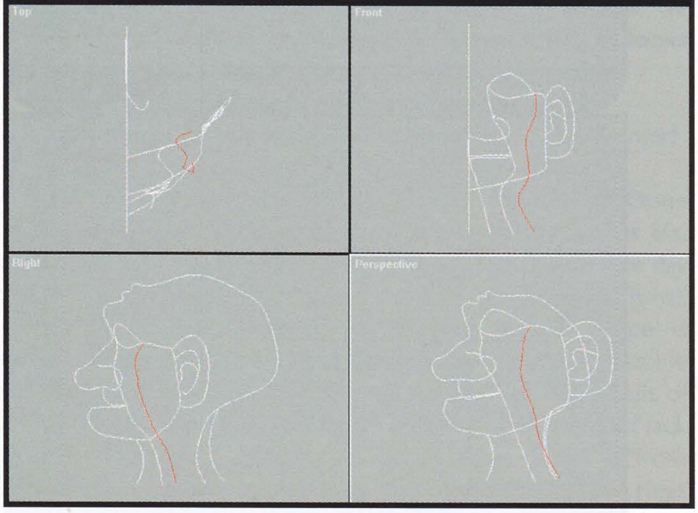
You can add to an existing spline by dragging over the end of a spline while in Create Line mode. A small icon will appear when you are allowed to do so. Be sure this is what you want to do before you do it, because the placement of the new vertex can effect the shape of the old spline. However, you can always move the vertices back.

Try this new technique by adding onto the spline that creates the smile line and the bridge of the nose. Make the line continue up and around to define the top of the head as shown in Figure 8.

Next you will need to define the eye socket. Create splines crossing through the eye as shown in Figure 9. To make things easier, use 3D Snap when creating the splines. That way, when you place each vertice, they will snap to existing vertices, therefore saving you the time and the hassle of moving them manually. The eye socket is only temporary for now. We will refine it later.

Next we will move onto creating the brow. Create a line to define the top crown of the brow as shown in Figure 10. You can then continue the spline from the top of the eye, up and around the top of the brow.

Figure 6 Creating Contour Lines.



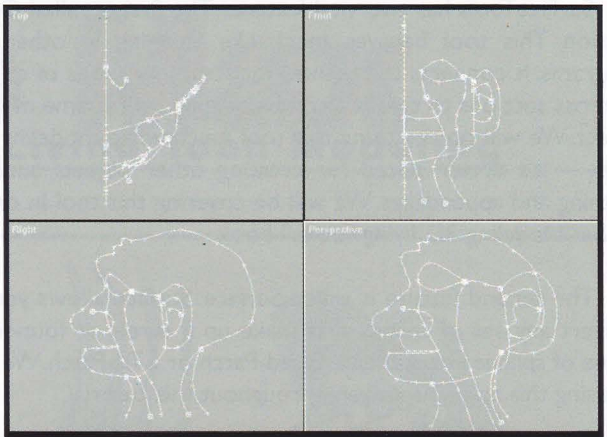


Figure 7 Lining Up the Vertices.

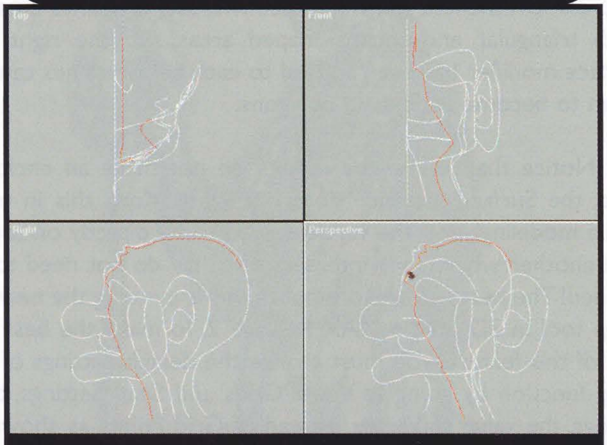


Figure 8 Adding onto an existing Spline.

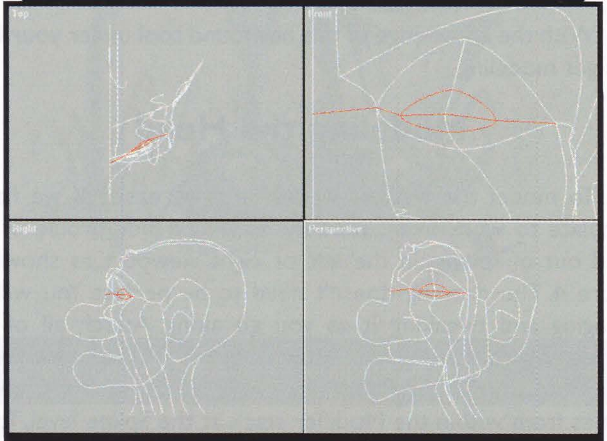


Figure 9 Creating the Eye Socket.

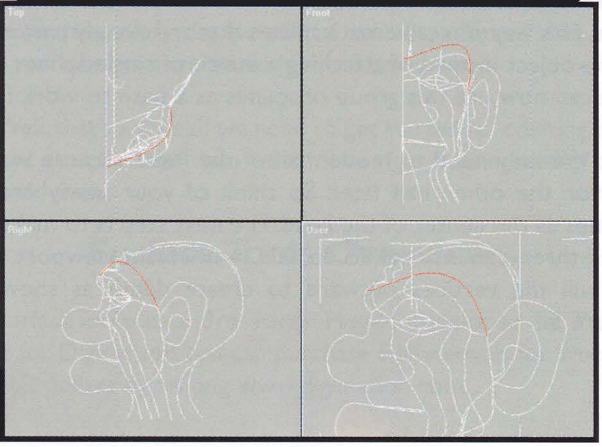


Figure 10 The Spline for the Brow.

Now that you have created the brow, lets move on to his big 'ol nose. To create his nose, lay one spline down the length that attaches to the edge of the nostril, then create two more splines that run vertical to define the circumference as shown in Figure 11.

Next we need to start creating the horizontal lines that create the square areas that will make up the patches across the face. Making sure that 3D Snap is selected, create splines starting from the nose and move outwards across the face. It is easiest to do this in the User Viewport with all of the vertices visible. Since you have 3D snap selected, you don't have to worry about your splines going out into space. Use Figure 12 as a reference.

Continue creating intersecting spines until your old man's head looks like the one shown in Figure 13. If you are having trouble seeing where the intersecting vertices are, rotate your model so you can see them. If there aren't any vertices on the crossing splines, create some by going to Modify/Sub-Object/Vertex/Refine. Then simply click on the spline where you want your new Vertex.

Detaching the Eyesocket

Next we need to detach the eye socket. The reason we need to do this is because if we were to add the Surface modifier, it would lay a patch over the eyesocket, filling in the hole since the area is made up of four vertices.

Now comes the fun part. Go to Modify/Sub-Object/Segment and detach the segments around the eye. We will be re-building the eye socket separately, later. Now back out of Sub-Object mode, and select the head. With the head selected, go to Modify/More, and choose Surface. Whala! All of the splines that don't make up a square or triangular area disappear. All the ones that do, become patches! Your model should now look like Figure 14.

Now it's time to re-build the eye area. The reason we are doing this is to show you that your model is an ongoing process. Nothing is permanent. If you want to change something, you can. In this case, I wanted to create more splines to define the upper part of the eyelid so the splines could continue up and over the brow, then continue on back to define the shape of the head. Using Figure 15 as a guide, re-build the eye area as shown.

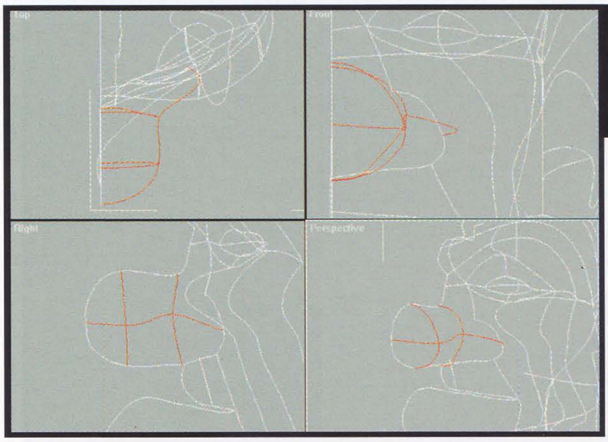


Figure 11 Creating the Nose.

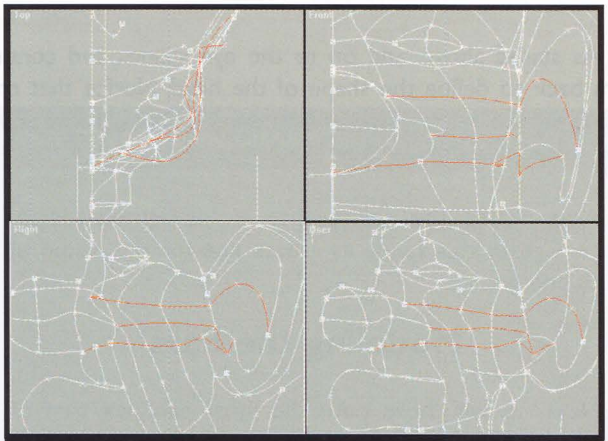


Figure 12 Intersecting Splines.

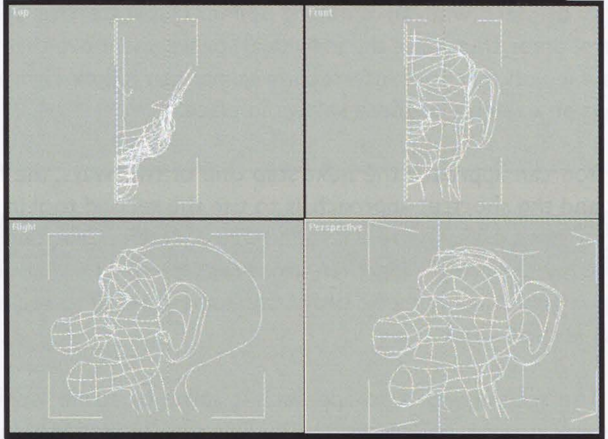


Figure 13 More Intersecting Splines.

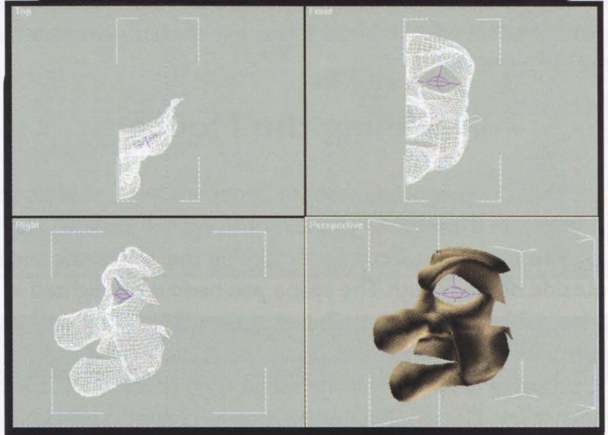


Figure 14 Testing the Surface.

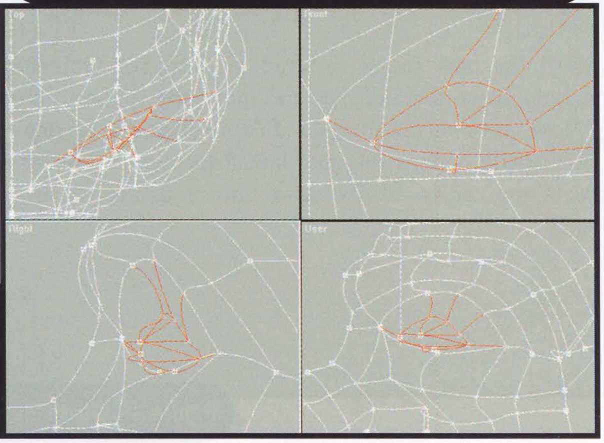


Figure 15 The Re-Build of the Eye Area.

As stated above, add on to the eye splines and continue them back to define the shape of the head. Notice that cross section splines are in place as well. After creating these spines, your model should now look like Figure 16.

Also notice the spline that is highlighted inside the mouth. Create this spline as a base line for the inside of the mouth and gums.

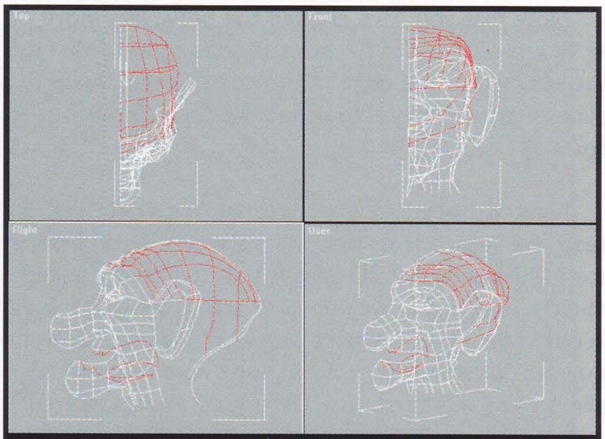


Figure 16 Building the Back of the Head.

Modeling the Ears

Next we will move onto the most complex part of the head, the ear! If you can create a good ear using SurfaceTools, you are ready to model anything! The best way to approach the ear is to start with an outlining spline. Duplicate this spline several times, then scale the individual splines and move them to create a path that your intersecting splines can follow. Figure 17 shows an example of these splines in place.

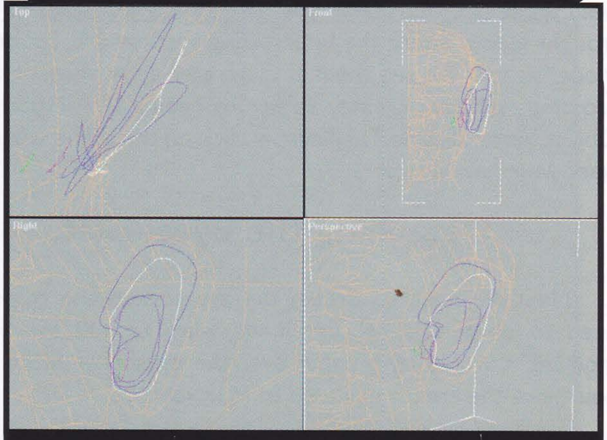


Figure 17 Creating the Base for the Ear.

You can approach the next step one of two ways; the first way, and the shortcut approach, is to use the second tool in the SurfaceTools pack. This tool is called CrossSection. CrossSection works by "skinning" together cross-section splines that have been attached in a numeric order. Look at Figure 18 to see how cross section works.

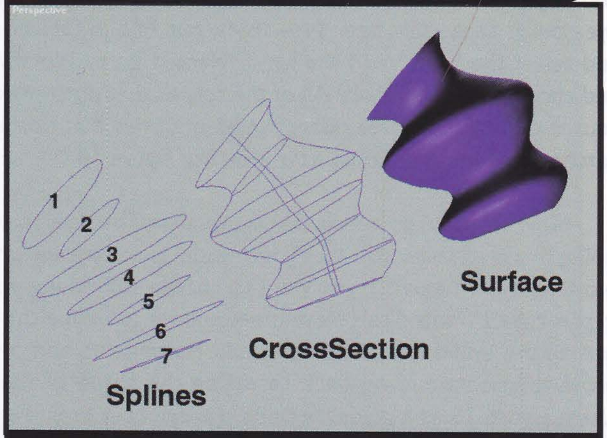


Figure 18 Example of CrossSection.

The second way is to approach it spline by spline working your way in as you go. This method could prove frustrating because you may end up lost in a web of splines. Take your time, you'll get it eventually. I chose the second method for this ear. Whichever way you choose, your finished spline ear should now somewhat resemble Figure 19.

Modeling the Mouth

It's time to give this guy some choppers. Well, at least some gums. To create the interior of the mouth we will also be using the CrossSection method. Start by detaching the spline that defines the outside of the mouth. The spline you need is highlighted in red in Figure 1.20. Detach this spline as a copy, so the original spline will remain intact. You can do this in Sub-Object mode under the Spline category. Simply select the spline, then check the Copy box, and then click Detach. Name this newly created spline Mouth. Then reverse out of Sub-Object mode, and select the new spline. You may want to hit the "H" key and select it from the list.

With the new spline selected, go into Sub-Object/Spline mode, hold down the Shift key and move the spline to create a copy. Now go to Vertex mode and manipulate the vertices until this new spline defines the gum line. Repeat this process again to create the crown of the gums until your splines look like Figure 20.

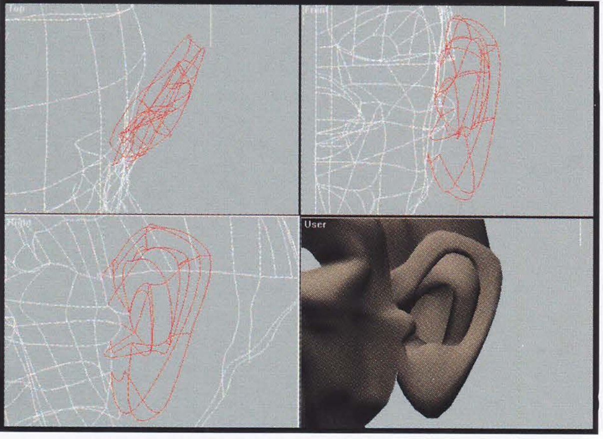


Figure 19 Cross Sectioned Ear.

Make sure that you copy each spline as instructed in the last step. You must create the splines in order, or you will have problems when it comes time to CrossSection them together.

Continue to make one more line to define where the gums go back into the roof of the mouth. Here's the tricky part. Copy the spline you just made. This time you need to manipulate the vertices until it resembles the back of the throat. The shape will change entirely, but you should have the same number of vertices defining the spline. Continue copying the spline over and over as you move towards the front of the mouth to create the tongue. To end the tongue, scale the last spline down to a tiny point. Surface will treat this point as if it were a single vertex, and create tri-patches on the end. The finished spline positioning may be seen in Figure 21. When you are finished, attach the newly created splines to the head. Remember to delete one of the splines that defines the edge of the mouth or you will have a duplicate spline.

Since you now have all of the splines that you need for the front of the head, you are now free to create the backside of the head. Using the same procedures as we have been using throughout this tutorial, wrap up the back of the head until it matches Figure 22.

Now that you are finished, it's time to see how well you did! Apply the Surface Modifier. Everything should look good. If it doesn't, go through these troubleshooting steps. First, check the box marked Flip Normals. This flips the viewing side of the patch to the opposite side. If there are still problems, check the box marked Remove Interior Patches. This removes any unwanted patches caused by accidental three or four point areas where the patch runs "through" the object, like the eye socket. Still having problems? If you have a checkerboard of patches missing, this means you have some vertices that aren't closed all the way. Zoom in on the problem areas, then use the 3D snap tool to insure that all of the vertices are snapped on top of one another. Now, other than final tweaking, that should be it.

Seaming the Head

The next step is to seam Sam's head together. There are also two ways of doing this. One way is to mirror the collection of splines, then delete one of the profile splines from one side, and then snap all of the exposed vertices to their mirrored counterparts. The second way is to add an Edit Patch on top of the Surface Modifier, then mirror it, followed by welding of the vertices down the center. I prefer the second method because you have more control. Also, if I mirror the head as an Instance, I can tweak one side of the model while affecting the other side, so I can get it to look the way I want visually, before welding it together. Take a look at Figure 23 to see the head seemed together.

Figure 20 Making the Gums.

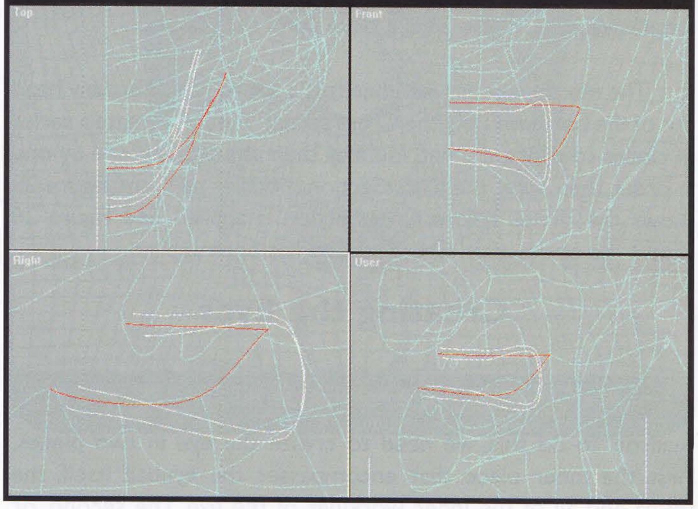


Figure 21 The Interior of the Mouth.

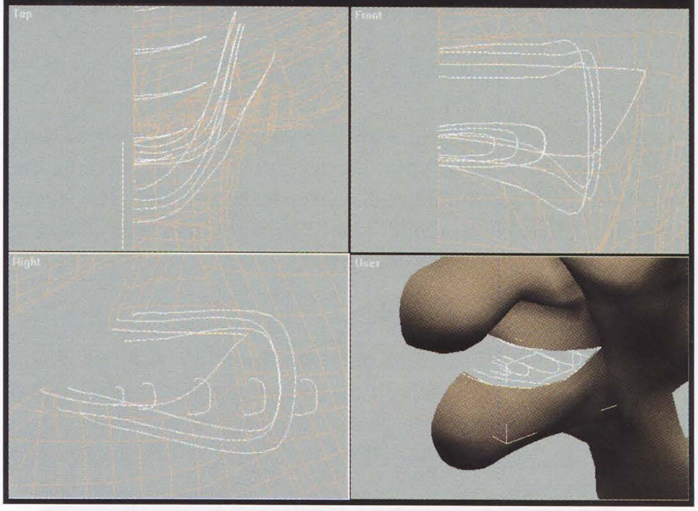
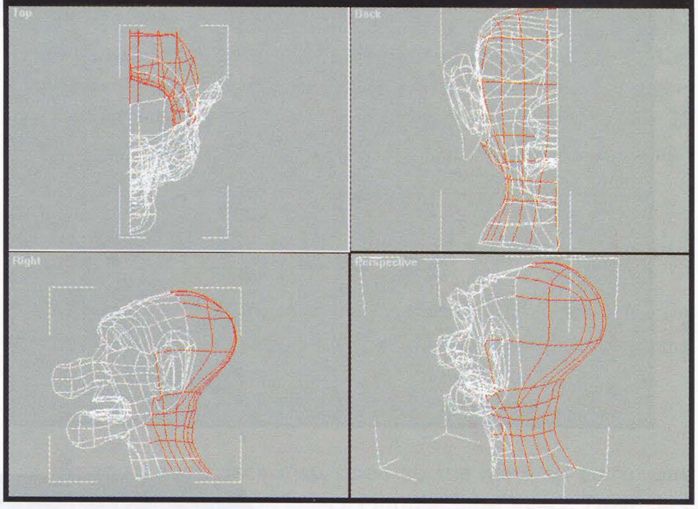


Figure 22 Finishing the Back of the Head.



Modeling the Accessories

Accessorize! Mr. Jones needs some glasses. The Glasses are made by lofting a small circle along several paths. The lenses are simple cylinders. Figure 24 is a close up of the glasses.

The next accessory Sam needs is a hat to keep his shiny head out of the hot sun. Using the Cross section method, create a series of circles to define the hat. You may then attach them one by one in order, then apply the CrossSection modifier to them. Figure 25 shows the circles before CrossSection is applied, and Figure 26 shows the circles after Cross section has been applied.

Creating the Eyes

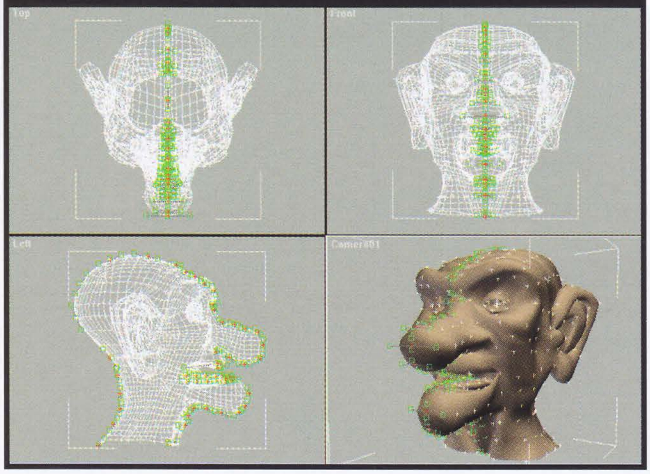
Lets give Sam some good looking eyes. To follow along with the Living Toons theme, we'll make his eyes fairly detailed and realistic. To do this, we need to create the eye in two pieces. First the inner piece that encompasses the eyeball itself, the retina and all of the inner workings of the eye. The second, or outer part, will simulate the cornea and the clear gel part of the eye. Take a look at Figure 27 to see how the eye was built. In the center is the image map applied to the inner part of the eye.

Surfacing Sam

Alright! Great job — now comes the fun part: surfacing your model! To surface your model, you must first define the areas that need to be mapped. A new feature within 3D Studio Max release 2 is 'patch ID#'s'. This allows you to assign different maps to different areas of your model.

For the head, we will split it into 3 separate material ID's. The head will be ID #1, the nose will be ID#2 and the inside of the mouth will be ID#3. To do this, select the head, click on the Sub-Object button, then select the Patch level. Scroll down until you see Select by ID. Click the Lattice checkbox, so you can see which patches you have selected.

Figure 23 Seaming the Head.



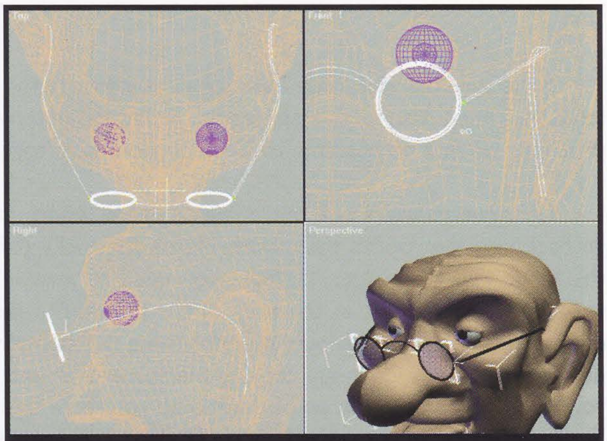


Figure 24 Lofting the Glasses.

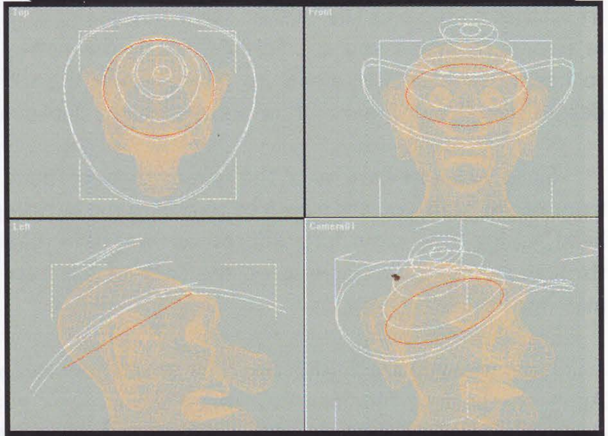


Figure 25 Creating Circles to Define the Hat.

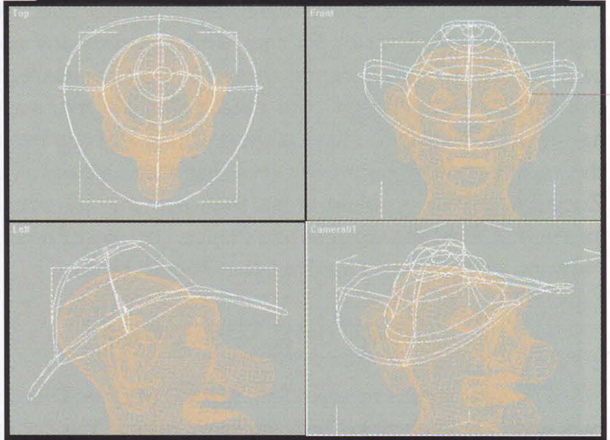


Figure 26 After CrossSection is Applied.

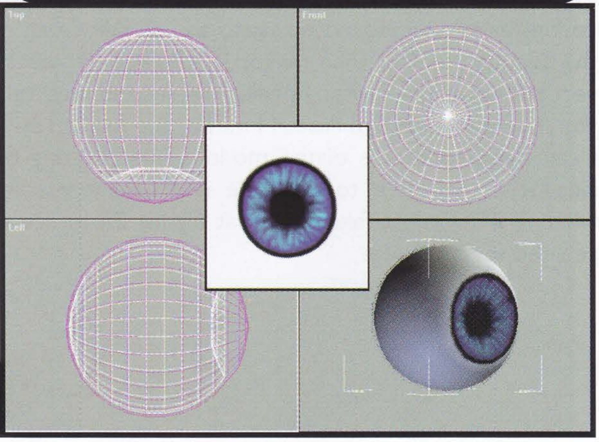


Figure 27 Detail of the Eye.

By default, the Material ID of a new object is ID#1. To change the nose to Material ID#2 do the following: in the left viewport, drag a box around the nose. All of the patches that make up the nose, along with the lattice, should turn red. Now type a number '2' in the field next to ID. This assign's these patches with a material ID of 2. Now do the same with the mouth. This is a little trickier because you have to rotate the perspective viewport around to make sure all of the patches that make up the mouth have been selected. You can add or subtract from your selection by holding down the Alt key as you select. Once you have the mouth and tongue selected, type a '3' in the ID field.

Now you can select by ID#. Click the 'Select By Material ID' button. Now choose a number and click ok. The correct area should turn red. If it doesn't, you must go back and re-assign them.

Adding UVW Mapping Coordinents

Now that you have accomplished the task of assigning Material ID's, it's time to put UV mapping coordinates onto each area. While in Sub-Object mode, use the Select by Material ID and select #1. The head should turn red with the exception of the mouth and nose. With this area selected, Click on UVW Map in the Modifier Menu. Next select Cylindrical mapping coordinates. This will wrap the map around the head. There would usually be stretching occurring at the top of the head, but since Sam will be wearing a farmer's hat, we won't have to worry about that. To align the Mapping Gizmo correctly, click on Gizmo and rotate the map so the direction line is on the top, and the cylinder surrounds his head vertically. Now rotate it in the top viewport so that the green line is in the back of his head. The green line signifies where the map will separate.

Next we need to apply mapping coordinates to the nose. With Sub-Object still selected, add another Edit Patch, select by Material ID #2. Now apply another UVW modifier. Select Cylindrical, and adjust it to fit the nose. You won't need to do this for the inside of the mouth, because we will be using a Procedural Material that does not require mapping coordinates.

Unwrapping the Head

The next step is to UnWrap the head mesh to a file so you can use it as a reference to paint your maps from. To complete this part of the tutorial, you will need to get a copy of Peter Watje's Unwrap plug-in utility from the Serious 3D website (www.serious3d.com)

When you have it installed, go to the utility section of MAX and scroll down to Unwrap Object Texture. Now you can unwrap the head. Select Use Material ID, Choose ID#1, select Pick Object, pick the head and save as headref.tga. Now you have a painting template for your head image map. You can do the same thing for the mouth and nose by choosing their respective Material ID#'s.

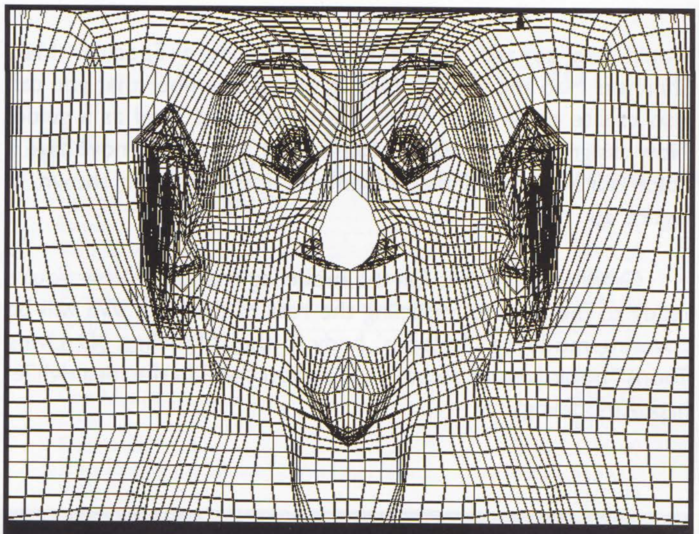


Figure 28 The Unwrapped Head

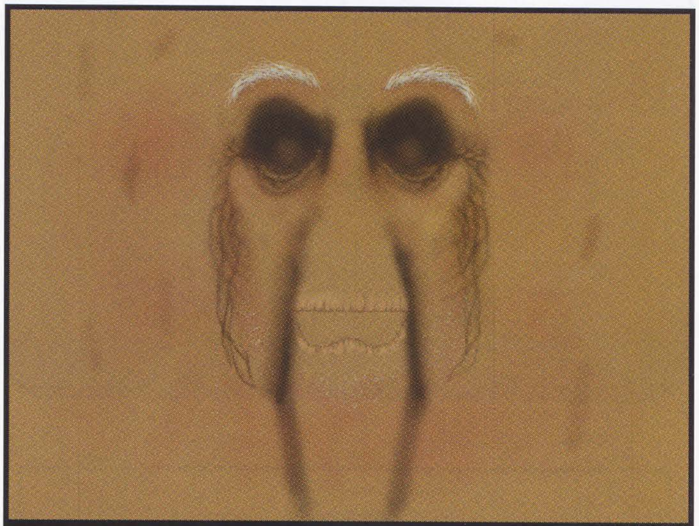


Figure 29 The Head Color Map

The next thing you need to do is create the image map. Open up your favorite painting program (such as Adobe Photoshop.) Then open up your headref image, which in this case is headref.tga. As you can see, Unwrap unwrapped the grid to give us a good reference template for painting. Figure 28 shows the unwrapped head grid and Figure 29 shows the map I painted based on it.

Follow the same procedure for both the mouth and the nose.

Refer to this month and last month's articles on Surfacing to get a deeper explanation on how to surface your characters.

Applying the New Map

To apply Sam's face map, open up the material editor and under the first map slot, select Mutiple/Sub-Object. Then click on Diffusion Map and add the newly created color map. If you would like to add even more detail, use a Specular Map, Shininess Map and a Bump Map as well. Remember that you can also create these maps using the unwrapped head as a guide. Now assign the new map to Sam's head. You should now have a color surfaced head that resembles the character shown in Figure 30

Great job! That's it for the modeling the head. Now you're ready to move onto modeling the rest of the body. We will be covering modeling Mr. Jones' body in the "Modeling 3D Living Toons" book (see ad on page 1) See you then! In the meanwhile, happy modeling!

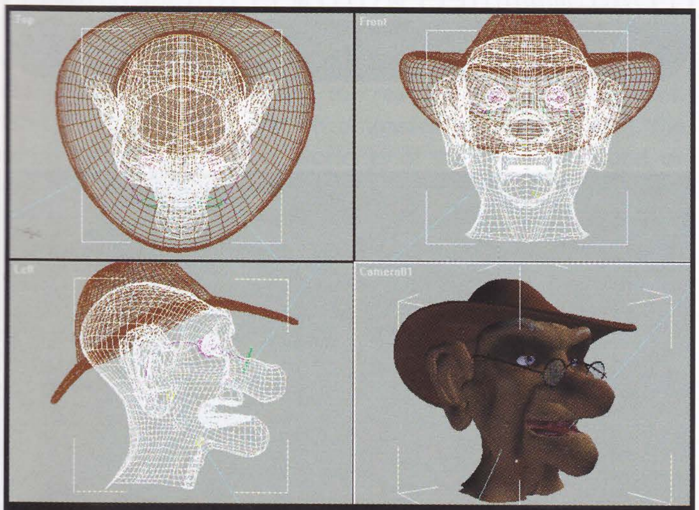


Figure 30 The color maps in place.

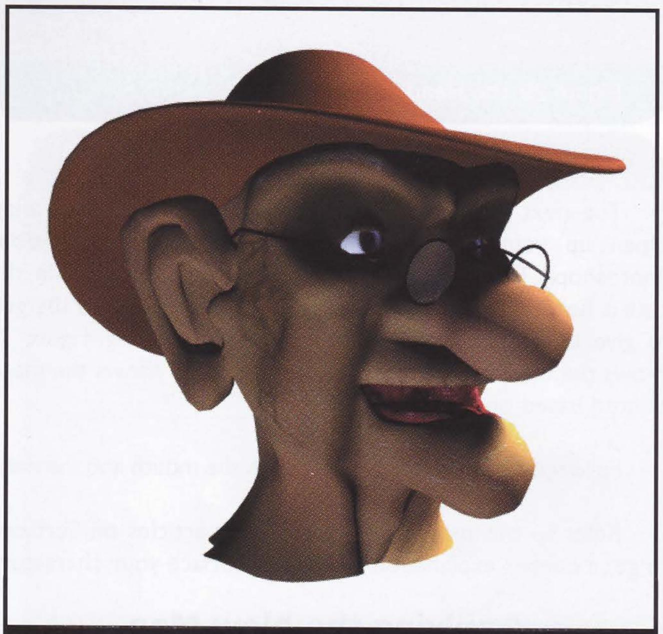


Figure 31 Farmer Sam Jones in all his glory.

Serious 3D Contributors

Shane Olson:

Shane is originally from Utah, is a graduate from the Art Institute of Seattle in Computer Animation and is now a Freelance Animator/Modeler and writer currently residing in Seattle. He has been into animation for about five years and his character design style has been directly influenced by animators from Disney and Warner Brothers Studios. He started out learning 3D by fidgeting with such programs as Ray Dream Designer and Caligari trueSpace. Shane is now creating organic cartoony characters using 3D Studio MAX and Softimage. He is a contributing author of "3D Creature Workshop" published by Charles River Inc.

Robert Ward:

Robert is a professional freelance artist specializing in 3D character design, modeling and animation, and is an expert user of Animation Master and LightWave. Robert is a contributing author of "3D Creature Workshop" published by Charles River Inc., and a member of Team Komodo.

Darris Dobbs:

Darris Dobbs is a professional 3D artist and writer from Wichita, Kansas. He is the co-owner and creative director of HieroglyFX Design, a full-service 3D graphics and animation studio. Darris has a degree in Animal Science and a background working with a wide variety of animals. He takes advantage of this experience to create his specialty; lifelike, photorealistic animal and creature models. He also specializes in creating creature models, expressive caricatures and recreating historic settings. He is co-author of "Creature Creation with trueSpace 3.0", published by Charles River, Inc.

John Sledd:

John is a reclusive freelance Illustrator, author and sometimes-animator based deep in the mountains of Front Royal, Virginia. His specialties range from a retro-esque science fiction style (his trademark) to cartoons and even a smattering of technical and photorealistic work, when called for. He is also the editor/author of the Ray Dream Handbook, 2nd Edition and the forthcoming ElectricImage Handbook published by Charles River Media, Inc.

Shamms Mortier:

Shamms has written over 700+ articles over the last eight-plus years for a number of magazines, which include TV Technology magazine, DTP Journal, Computer Graphics World, Digital Magic, Web Techniques, Dynamic Graphics, Step-by-Step, 3D Design, 3D Artist, Amazing Computing, Video Toaster User, Computer Shopper, JumpDisk and many more. He is the author of a number of books including Bryce 3D, published by Charles River; Macromedia's BackStage Designer, FreeHand 7 Graphics Studio and RayDream 5 F/X, published by Ventana Publishing.

Planet of Goods

1-800-764-8696
(U.S Orders Only)
1-805-726-3545

We will beat or match any advertised price.

Books for 3D Studio Max

3D Studio Architectural Rendering	$39.00
3D Studio For Beginners	$35.00
3D Studio Hollywood & Gaming Efx	$45.00
3D Studio IPAS Plug-In Ref.	$49.00
3D Studio Max 2 Fundamentals	$39.00
3D Studio Max Design Guide	$39.99
3D Studio Max Fundamentals	$39.00
3D Studio MAX Plug-Ins Guide	$49.99
3D Studio Special Effects	$44.00
Character Animation W/3D Studio MAX	$39.99
Inside 3D Studio Max Vol. III	$54.00

Videos for 3D Studio Max

3DSMax Special Effects Vol. 1 Outer Space	$77.95
3DSMax Special Effects Vol..2 Underwater	$57.95
3DSMAX Special Effects Vol.1 & 2	$127.00
3DSMAX Special Effects Vol.1&2 &3DSMAX Special F/X	$147.00

3D Studio Max Plug-ins

Atomizer	$88.00
Bones PRO Max	$460.00
Cartoon Reyes	$465.00
Chameleon•	$88.00
Dirty Reyes	$465.00
Glider	$139.00
Lightning	$88.00
Ray MAX	$275.00
Ray Studio	$275.00

Videos for LightWave

LightWave 3D 5.6 Natural Effects	$37.95
Aura Video	$24.95
Aura Initiation	$37.95
Both Aura videos	$59.99
Animation Essentials 5.5	$37.95
LightWave Quickstart 5.5	$37.95
Power Modeling	$37.95
Natural Effects	$37.95
Organic Modeling & Animation	$37.95
Modeling Essentials	$37.95
Kinematics & Contortions	$37.95
All 7 LW 5.5 Videos	$259.00
LightWave Lab Video Vol. 1	$39.95
LightWave Lab Video Vol. 2	$35.00

Software

4D Paint	$439.00
Aura	$545.00
Bryce 3.0	$189.00
Concerto	$3395.00
Mesh Paint 3D 1.6	$199.00
LightWave 5.6 (Intel)	$1685.00
LightWave 5.6 (Dec Alpha)	$1699.00
LightWave 5.6 (Mac)	$1749.00
Sound Forge 4.5	$272.00

LightWave Books

Inside LightWave 3D 5.5 Book w/CD ROM	$39.95
LightWave Character Animation with CD	$44.95
LightWave Power Guide Book w/ CD	$43.50

Royalty Free Music

Life Songs Vol. I	$25.00
Token Video Buyout Music Volumes 1, 2, & 3	$25.00 Each
Token IV	$35.00
Volcano Music CD Vol.1	$19.95

Plug-ins for LightWave

Impact	$250.00
Particle Storm 1.3	$195.00
Particle Storm upgrade 1.3 - 2.0	$315.00
Particle Storm 2.0	$485.00
World Builder 2.2	$549.00
World Builder 2.2 Pro	$749.00
Animation Master 98	$169.00
Con Motion	$395.00
DAB	$89.00
Debabalizer	$399.00
Fiber Factory	$135.00
Fiber Factory 2	$127.00
Film Grain	$134.00
Fractalizer	$129.00
Genesis VFX	$315.00
Lock & Key	$110.00
Lume Tools	$Call
MacroForm	$242.50
Motion Designer	$357.99
Particle Storm 1.3	$195.00
Particle Storm 1.3 to 2.0	$315.00
Particle Storm 2.0	$485.00
Puppet Master	$275.00
Realitools	$129.00
Shaderman 2.0	$129.00
Surface Effectors	$77.95
Thor	$115.00
Tree Druid	$189.00
World Construction Set V 4.0	$639.00

Truespace Books

Caligary Truespace 2 3D Modeling Construction Kit	$37.99
Caligary Truespace 3 for Dummies	$29.99

CD-ROMS

Lite-Rom 6	$37.00
Fire CD	$43.99
Reel Fire 1	$315.00
Reel Fire 2	$315.00
Reel Explosions 1	$315.00
Reel Explosions 2	$315.00
Reel Explosions 3	$315.00
Tutorvision Vol . 1 & 2	$89.99
Dark Tree Textures	$295.00
Dinosaurs ROM Vol. I CD	$125.00
Dolphin Collection Vol. 1	$169.00
Dolphin Collection Vol. 2	$169.00
Enzyme Shaders	$89.00
FireCD	$43.99
LENY CD ROM	$69.00
LENY CD ROM Vol. 2	$42.00
Leny Set with free T- Shirt	$105.00
Seamless Textures You Can Really Use	$89.00
The Universal 3DCD	$115.00
Tutorvision 3DCD Vol. 1	$47.99
TutorVision 3DCD Vol. 2	$47.99

Miscellaneous

Oxygen GMX	$1899.00
Oxygen RPM	$1299.00
Bravado DV2000	$475.00
On Stage	$1275.00
Perception RT Video Recorder	$Call
Adobe Premiere 5.0	$589.00
Inspire 3D	$389.00

Order Securely @
http://www.planetofgoods.com

Sales@planetofgoods.com
Info@planetofgoods.com

Check out our new
LightWave Artist's Image Gallery!
Only at www.planetofgoods.com

Creating Cool Characters

Living Toons™

By Bill Fleming

So... what exactly are Living Toons™? Simply put, they are a hybrid of human and cartoon characters. They perfectly merge human features with that zany cartoon personality! Of course, this is a very sparse description. Much more can be said about these unique characters but, first, we should take a look at how this style was developed. Let's get historical!

A Little History

By now, people have been creating 3D characters for many years. These have typically fallen into just two categories: cartoon, or photorealistic (or perhaps 'nearly photorealistic.') These styles parallel the established norms of other 'character art' forms — 2D cartoons and actual people. We've seen thousands of animated cartoon characters in Disney films, on TV, and in comic strips. Similarly, we've seen far to many 'real' humans to count — they're everywhere! Given such wide saturation, these character forms have lost a great deal of their visual impact. There's not much that we haven't already seen.

When was the last time an animation made your jaw hit the floor in amazement? It probably hasn't happened in a long time, has it? I can tell you it's been years since it last happened to me. Why? Well, it's quite simple: No matter how impressive Disney's animated features become, they retain all of 2D's limitations. Even with the addition of composited 3D elements, they lack real 'shock value.' Likewise, we've seen plenty of real people in action films and like media — but they remain merely 'people,' with limited appeal. On the other hand, have you observed how audiences flock to movies where the villain is an alien or monster? These are novel characters. The creatures have personality traits, features and abilities we aren't used to seeing!

OK, what's wrong with 'standard' cartoon characters and photoreal people? Nothing really, except it's been done to death. Consider cartoon character animation: In spite of the unique characters these animations may exhibit, the process is rather unimaginative. The style of animation hasn't changed since it began. Sure, the quality has improved, but the style hasn't changed. Take a look at any other industry, and you'll see frequent change (particularly when technology advances.) Compare the caliber of effects in action movies today to those ten years ago. Take a look at the garments you wear. I'm positive you aren't wearing the same style of clothing you wore ten years ago (unless you're either a bachelor, or a computer graphics artist who hasn't left home in ten years except to upgrade your computer.)

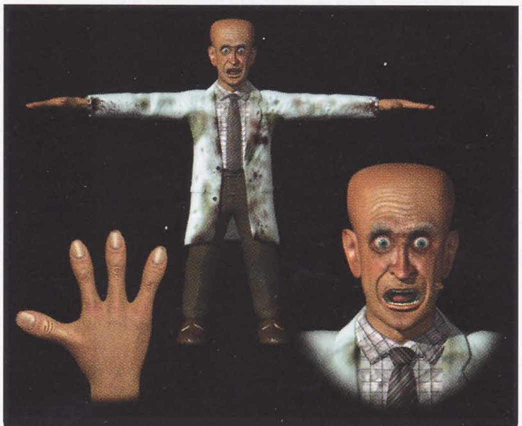


Figure 1 Living Toon shock value.

Get the point? When things don't change with time, we become bored and complacent. Technology has advanced, but we merely use it to speed up the same old work. We should be finding new ways to exploit the technology. In a bizarre twist, animators are looking backward in a search for novelty. Productions like the Simpsons, King of the Hill and South Park use simplistic animation techniques that can be done without the need for serious technology. OK, so there was Toy Story. Undeniably it was a milestone in animation history. When you think about it, though, the environments attempted to 'clone' reality, and the humanoid characters in the film were still rather 'cartoony.' They did hit on something very interesting: the artists attempted to add a little photorealism to the characters, by creating skin and hair. This was a great use of technology, actually the only instance where something of this nature has been attempted commercially.

We've established that the existing forms of character development are somewhat repetitive, and certainly no longer unique. Where do we go from here? We do a little 'digital alchemy,' some computer-surgery, and create our own Frankenstein's monster. In short, we'll take the best of both styles — cartoon and photoreal — and combine them into one new and unique style. You'll see that this will open the door to a plethora of new animation possibilities, hence, the creation of Living Toons.

Enter a group of frustrated computer graphics wizards at Komodo Studio (a 3D studio based in San Diego). They sat down together to find ways to combine the favorable features of both cartoons and humans. The object was to create a brand new character style having a great deal of shock value. The resulting new character style was christened 'Living Toons,' implying cartoon characters that have come to life. These little guys are more than cartoon characters with a facelift — they are an entirely new creation, one offering a number of truly unique possibilities. What we have, is a cartoon character who looks completely at home in the real world.

We're not talking Roger Rabbit here. We're speaking of characters that closely resemble humans, but retain the personality and features of a cartoon character. They are loaded with shock value! They tend to make the viewer 'crawl out of their chair.' Why don't we get acquainted with a Living Toon character. 'Dr. Dread,' the mad scientist, is one of the digital actors in 'Dwellers,' a short film under development at Komodo Studio. Let's meet him, shall we?

Living Toons have Shock Value!

Take a look at Figure 1. Here's a nice picture of Dr. Dread, who was kind enough to pose for this article (Living Toons can be rather temperamental at times). What was your immediate reaction to Dr. Dread? I'll bet it was something akin to shock — he stops most people in their tracks. Living Toons have powerful shock value, something traditional character styles no longer possess. While photorealistic creatures and characters can certainly be impressive, they lack that totally eerie feeling that you get from seeing a Living Toon. It's a feeling that something is somehow 'wrong.' In a sense, something is very wrong — a toon has come to life!

Look closely at Dr. Dread, and you'll better understand his shock value. What we have here is a cartoon-like character, but with photorealistic surfacing and human features. The shock value comes from the fact that he looks rather like a deformed human, something that typically makes us a little uncomfortable. It's disconcerting. He seems 'alive,' but has features we aren't accustomed to seeing on humans. This is what engenders the shock value. The more you look at him, the more eerie he becomes. Cool isn't it? You bet it is! Just think of the many possibilities for animating a character like this.

Living Toons share many of our physical traits, but they don't succumb to our rules of physics. These crazy little characters still retain their cartoon physics, which means they are capable of anything. They can fall off a 20 story building and bounce. They can get smashed flat by a steamroller, and pop back to normal as though nothing had happened. They can even swell up into a balloon! You name it, and they can probably do it. When they create facial expressions they can move both muscles and underlying skeletal structure. Yes, they can completely alter their skeletal structure to create some rather amusing expressions. Think of the possibilities! What we have is a human that can do incredible feats without being suspect. We accept whatever they do because they are 'cartoony.' We wouldn't accept a photorealistic human model doing wild antics, but we do accept it from a toon. Since Living Toons exude cartoon personality and features, we accept their bizarre behavior without question. We have here a cartoon character who looks completely at home in a real world environment, yet can do the most outrageous feats without being questioned by the viewer. Just let your imagination run wild with the possibilities! We can employ photorealistic environments with a character that blends in without limiting our creativity. There is literally no end to the number of uses for these characters.

OK, we understand the advantages of a Living Toon. Now, what are the features that make a character a Living Toon? Well, that's a great question — let's explore it for a moment.

The Elements of a Living Toon

So what are the features that make a character a Living Toon? Well, the surfacing has a great deal to do with it, but really it all starts with the model. You have to have a solid model foundation or you won't be able to create the Living Toon effect.

Before we get into actual features, let's take a look at the types of Living Toons. There's a wide range of Living Toons, ranging from 'human-like' to 'near-cartoons.' Dr. Dread, for example, leans heavily towards human — so, his features tend to be more neutral, though he does have large eyes and a huge head. On the other hand, there are characters that tend more towards the cartoon style. Let's take a look at the spectrum of Living Toon variation, as shown in Figure 2.

Here we have several Living Toons. On the far left is the head of Dr. Dread — he leans heavily towards human, making him a Level 1 Living Toon. In the middle is Tommy the gangster. Tommy sits right in the middle between human and toon, making him a Level 2 Living Toon. Notice the exaggerated features of a cartoon character, yet all the parts are easily recognizable as human. Finally, the guy on the far right is a Level 3 Living Toon representation of Homer Simpson. You can see that he possesses realistic details, such as the ears, nostrils and teeth, but still has those classic cartoon proportions. Of course, these are merely the modeled portions of a Living Toon. They take on a whole new look when we add the surfaces, which we'll be looking at shortly.

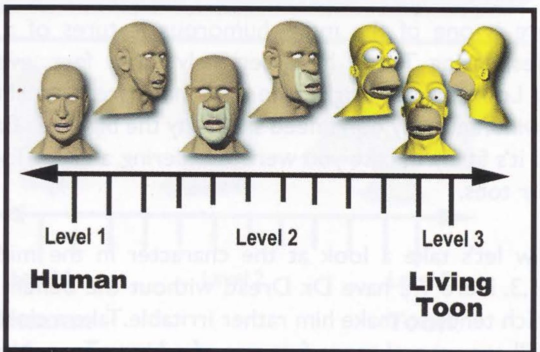


Figure 2 The Living Toon spectrum.

For now, let's take a look at a Living Toon model, to see what makes it tick. We'll use Dr. Dread for our study. Of course, he doesn't appreciate having his skin ripped off, so you'll have to forgive his expression of displeasure.

Take a close look at Dr. Dread's features, as shown in 3.

Features of a Living Toon Model

Look at his ear. Notice how it contains all the usual features of a human ear. The sole significant difference is that they are significantly larger, or smaller than a human ear. For example: A male Living Toon has a much larger ear than a human, while a female Living Toon has an ear that is much smaller. A lot of detail in the Living Toon ear helps make the character more photorealistic.

Here's one of the most significant features of a Living Toon. A Living Toon mouth is exactly the same as a human. They have the same gum features, and the same number of teeth. Of course, a Living Toon is capable of much more expression than a human. The reason a Living Toon has such a detailed mouth is to give it a natural look when speaking. It's also a bit 'freaky' when it does cartoony antics with its photorealistic mouth.

Now take a look at the nose and eyes. Again (like all other features) these elements are the same as you would find on a human. They can be more exaggerated than human features, but they must contain the same details — tear ducts and eyelids on the eyes, and nostrils on the nose. Living Toons have plenty of detail in the eyes and nose to permit a greater range of expression than a typical toon.

OK, here's a distinctive feature of a Living Toon. The Living Toon hand has only three fingers, instead of four like a human hand. Of course, they retain several human hand features such as fingernails, bones and tendons, but they are limited in fingers, since cartoon characters traditionally sport only three fingers.

Here's another shot of the Living Toon hand, showing the knuckles. Notice that a Living Toon has only one knuckle, instead of three like a human. The knuckles are typically enlarged as well, to add more personality. A toon hand typically has no knuckles at all, since it's a tube. So, a Living Toon has a reduced knuckle count to look more cartoony.

Here is one of the more humorous features of a Living Toon. Yes, Living Toons have seriously large feet, even the females. Look on the bright side, they have great stability in a strong wind, and they don't need skis. Why the big feet? Basically because it's funny. In case you were wondering, a Living Toon has only four toes.

Now let's take a look at the character in the middle of Figure 1.3. Here we have Dr. Dread without the benefit of his skin, which tends to make him rather irritable. Take a close look, and you'll see several more features of a Living Toon. Note the arms that are significantly longer than a human's, and legs that are much shorter. Also from this view, you can see that Living Toons have rather large hands. Even the women have large hands! Of course, they are much more attractive.

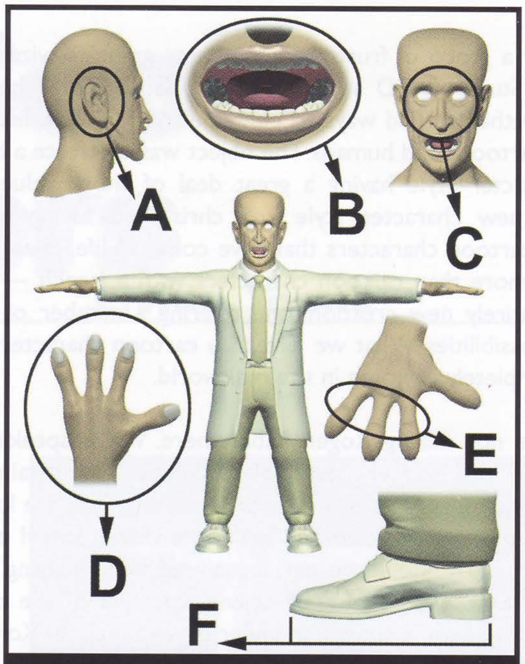


Figure 3 Features of a Living Toon.

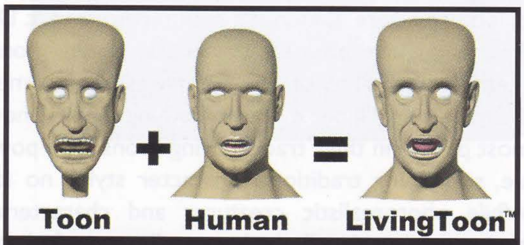


Figure 4 Creating a Living Toon Hybrid.

Well, that about does it for the model details. Before we move on to the surfacing details, lets take a look at the evolution of a Living Toon. That is, how they are transformed from a toon into a Living Toon.

Living Toon Evolution

There are two major elements on a Living Toon, the head and hands. These are the areas of greatest detail on any character, whether they are a Living Toon or not. Therefore, we need to pay close attention to these areas when we create our models. Let's take a look at creating the hybrid of human and toon for the head and hand.

We'll start with the head. Dr. Dread is a 'German' scientist, so, what we need to do is virtually morph his original cartoon character with a human (of German decent) as shown in Figure 4.

On the far left, we have the original 3D toon head for Dr. Dread. We've combined it with the photoreal human head in the middle to create a Living Toon (seen on the far right). You can see that we have adopted the ears, eyes, nose, mouth and neck detail of the human. Still, we maintained the proportions of the toon head. Take a close look at the Living Toon head on the right: you'll see that the eyes, while large, like a toon, still have the detail of a human eye. Look above the eye. The bones in the forehead actually change shape with his expression, giving the Living Toon much more character than a human head.

Now, look at those big ears. They have the size of a toon but the detail of a human. This is one of the most striking features of a Living Toon. The ears are always neglected on a toon (they are typically neglected on 3D characters too!) You can see how they add a great deal of dimension to the Living Toon. For another great example, look back at the Living Toon model of Homer Simpson in Figure 2. Those ears really bring Homer to life. They still have the cartoony shape and size, but incorporate the human detail.

Finally, take a look at the mouth of the Living Toon. He has very detailed teeth. The teeth and gums are important too, especially since Living Toons can achieve the most extraordinary facial expressions, often revealing inner mouth detail. Let's take a look at some Living Toon inner mouth detail. Look at Figure 5.

Here we have 'Knuckles' the gangster, who always has his mouth hanging open. You can see that the gums have been modeled for each tooth. This is an important element in creating Living Toons, particularly if you plan to knock out a few teeth. It's these details that bring the cartoon character to life. It's also what makes them so darn eerie! Speaking of eerie, let's take a look at those bizarre Living Toon hands.

Take a look at Figure 6, which shows the evolution of a Living Toon hand.

As you can see, the typical cartoon hand has 3 fingers and a thumb. They also lack knuckles, though they hypothetically have one. To create a Living Toon hand, we must honor the original structure of the cartoon hand. Yet we must also add the details of a human hand (shown in the middle) such as knuckles, tendons, bones and fingernails. What we end up with is the freaky hand you see on the far right — a classic three-finger toon hand with realistic details.

Well, that about does it for the modeling aspect of Living Toons. The last thing we need to examine is the surfacing.

Living Toon Surfacing

Surfacing is a critical part of Living Toon development. It's where we get to freak out the viewer by bringing the character to life. Nothing seems more bizarre than a human with wacky, exaggerated details. Making the surfacing of Living Toons photorealistic is an essential part of making them compatible with reality.

There are three ways to surface your Living Toons: Level 1 (Realistic), Level 2 (Detailed Cartoon) and Level 3 (Classic Cartoon). Let's take a look at examples of the Living Toon surfacing levels. See Figure 7.

Here we have the three possibilities for Living Toon surfacing. The Level 1 head shows an incredible amount of realistic detail, making it appear more human. The Level 3 head retains the classic cartoon surface attributes. Take a look in the middle, and you'll find Level 2 surfacing. It contains all the elements of Level 1 (realistic) surfacing, but toned down a great deal, to make the character appear more cartoony. There are a wide variety of possibilities when surfacing Living Toons. The most complicated method is Level 1. Let's take a look at the guidelines for this method.

The goal of Level 1 surfacing is to give the character a skin texture with the nuances of human skin. There is a set of basic details you need to include when creating Level 1 Living Toon surfacing. To get a better idea of these attributes, let's take a look at Dr. Dread's face (Figure 8)

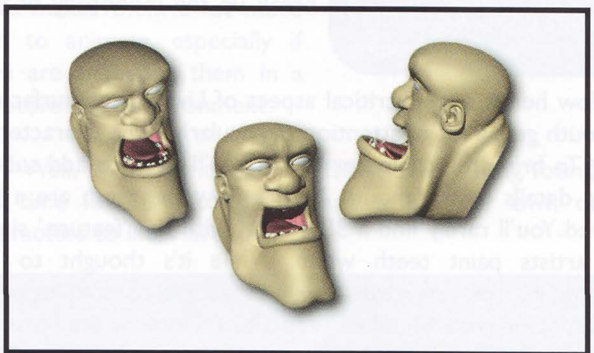


Figure 5 Living Toon inner mouth detail.

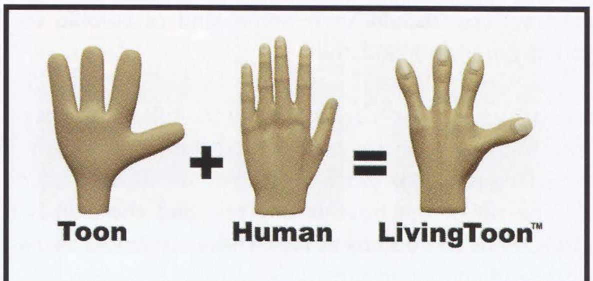


Figure 6 The Living Toon hand evolution.

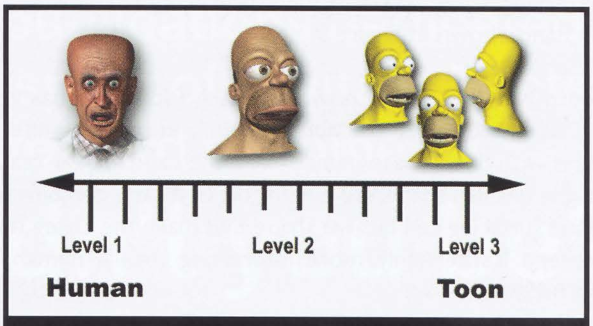


Figure 7 Living Toon Surfacing levels.

Wow, it's kind of getting eerie again isn't it? Take a close look at Dr. Dread's face, and you'll see some serious detail. While the model does a great job at laying the foundation, surfacing brings the character to life. Let's examine the specific traits of Level I Living Toon surfacing.

Details of Level I Living Toon Surfacing

Take a close look Dr. Dread's eye. Notice how it contains a realistic iris. Look a little closer, and you'll see that it also has small veins in the corner closest to the nose. It's this small detail that adds tremendous realism to the eyes. The eyes are the first place the viewer will look, so you'll want to make them very detailed.

Wrinkles, while thought to be unflattering, are a significant aspect of Living Toon surfacing. Particularly valuable are the ones that grace the forehead, and hover around the corners of the eyes. Yes, those crow's feet are important. Dr. Dread is rather old, so his wrinkles are more pronounced, but you'd still see subtle wrinkles in even the most youthful characters. To create realistic surfacing, you have to break up the monotony of the surface with subtle detail.

Now here's a very critical aspect of Living Toon surfacing: the mouth gets a lot of attention, particularly if the character is talking. To bring the character to life you'll need to add subtle surface details to the mouth. Notice how the teeth are a bit yellowed. You'll rarely find a 3D model with this 'feature,' since most artists paint teeth white. While it's thought to be attractive, it's not very realistic, unless your character happens to be an actor with whitened teeth. Take a look at the lips, and you'll see subtle wrinkles that are common on human lips. This helps to make the lips appear softer and more pliable — a necessary aspect of realism. Finally, if you have a male Living Toon (past puberty) you should apply some kind of stubble to the area around the mouth and chin.

Specularity helps the viewer identify the oily or taught parts of the skin. Notice how the area around the nose is shiny. This part of the face is usually more oily than the rest, so it tends to be shiny. The tip of the nose is oily too, and the skin is also taught, so it tends to be shiny as well. These attributes also apply to the forehead and inner ear.

To get a better idea of the "freaky" look you achieve with Level I Living Toon surfacing, let's take a close look at Dr. Dread's hand, shown in Figure 9.

Weird isn't it? Notice how the Living Toon hand has very detailed skin texture like the human hand, and those wonderful fingernails with dirt! These details make the hand appear real, in spite of the unusual shape and missing digits. It's the combination of realistic surfacing and bizarre shape that make the Living Toon hand creepy. It's certainly more interesting than a human or cartoon hand.

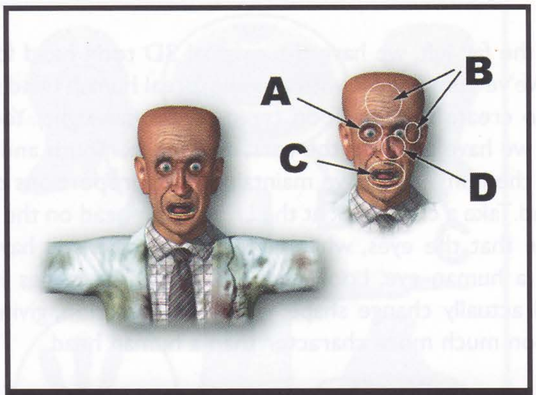


Figure 8 Dr. Dread's Surfacing.

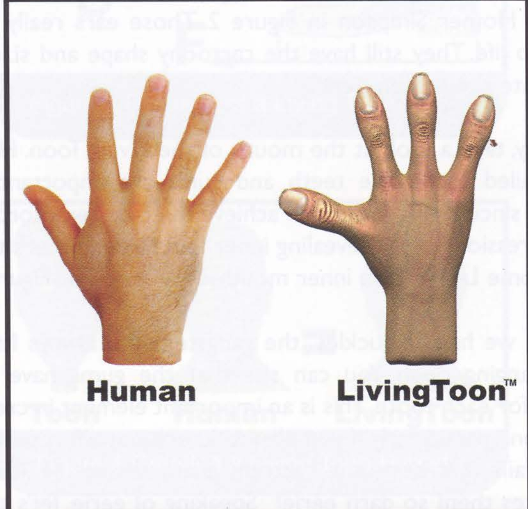


Figure 9 A Living Toon hand.

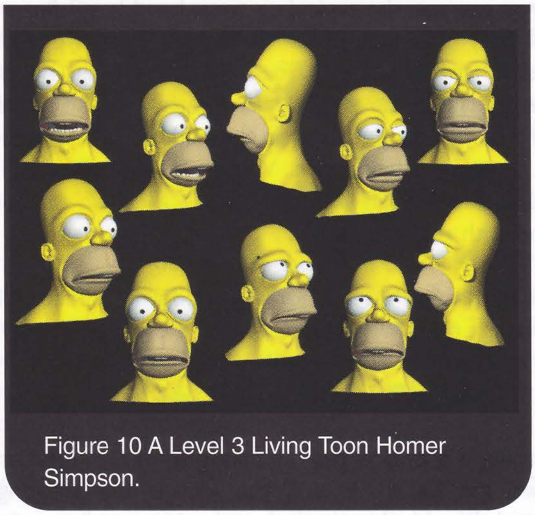


Figure 10 A Level 3 Living Toon Homer Simpson.

You can see how the surfacing attributes have given this Living Toon some freaky realism. Now that you've seen the extreme realistic side of Level I Living Toon surfacing, let's see how these attributes apply to the other end of the surfacing spectrum, Level 3. Look at Figure 10.

As you can see, not all Living Toons need to be photorealistic. You'll find many cases in which Level I Living Toons are too realistic. That's when you want to use one of the other levels. Our Level 3 'Homer' has all the Living Toon model attributes, but he still maintains his cartoony surfacing. Creating a Living Toon doesn't always mean sacrificing the cartoon look. In the case of Level 3 surfacing, you retain all cartoon surface attributes and still have the benefit of the Living Toon model detail to make the character more interesting. Homer can now join his other cartoon friends and blend right into the environment. Of course, he now looks a great deal more intriguing, which is what Living Toons are all about.

Creating Living Toon surfacing also requires that we surface the clothing with the same attention to detail used with the skin surfacing. If you're making a Level I Living Toon, you'll need to add subtle fabric textures and wrinkles, so the clothing matches the character's surfacing. Nothing looks more artificial than smooth clothing, particularly when it's worn by a character with realistic surfacing. Of course, when creating a Level 3 Living Toon you have the advantage of simply applying standard shaders to the clothing.

Well, there you have it — the main elements of Living Toon surfacing. As you can see, the surfacing plays a major role in making the character come to life.

It's Alive!

While there is certainly much more we can discuss about Living Toons, I think we've covered enough to get you started. There are literally endless possibilities with Living Toons. Take a look at Figure 11 and you'll see just how freaky these characters can look.

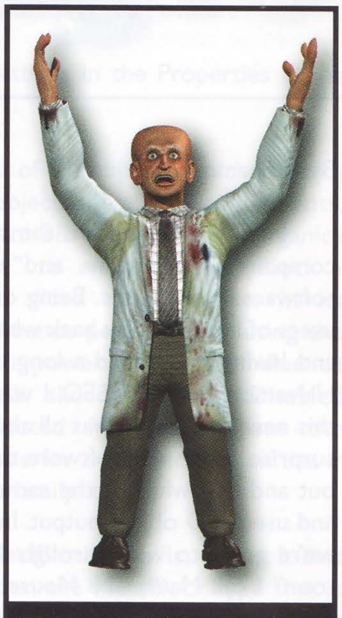
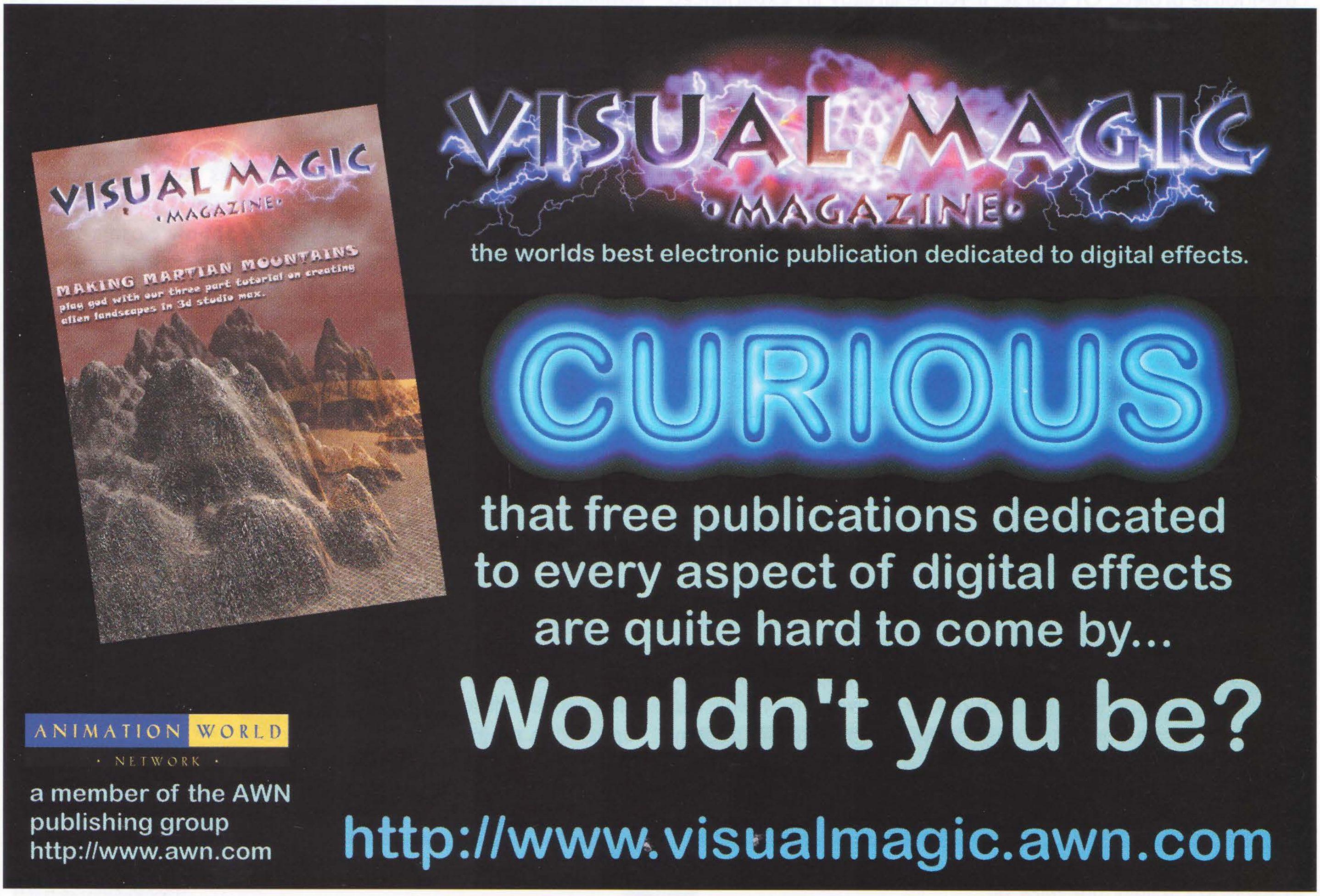


Figure 11 A Living Toon come to life!

He looks alive doesn't he? Not all Living Toons look like Dr. Dread. Most tend to lean towards Levels 2 and 3. The higher the level, the more animated the character looks. This makes them a lot more fun to animate, especially if you are animating them in a photorealistic environment.

Well, that does it for our discussion of Living Toons. Now it's time for YOU to dig in, and bring your own cartoon characters to life. Have fun!



VISUAL MAGIC
·MAGAZINE·
the worlds best electronic publication dedicated to digital effects.

CURIOUS

that free publications dedicated to every aspect of digital effects are quite hard to come by...

Wouldn't you be?

http://www.visualmagic.awn.com

ANIMATION WORLD
· NETWORK ·
a member of the AWN publishing group
http://www.awn.com

VISUAL MAGIC
·MAGAZINE·
MAKING MARTIAN MOUNTAINS
play god with our three part tutorial on creating alien landscapes in 3d studio max.

Organica

3D Toons with Impulse's Organica 1.0

By R. Shamms Mortier

Impulse's Organica is the latest application from a software company long known and respected for its Imagine 3D software: Impulse, Inc. Being one of the very first owners and users of Imagine (way back when it was only an Amiga package), and having maintained a long open correspondence with Mike Halverson, Impulse' CEO, I was very interested in seeing what this new application was all about. Wow. Was I in for a pleasant surprise. Here was software that was extremely easy to figure out and use, while at the same time producing highly exacting and useful 3D object output. In order to appreciate the project we're going to walk through later — the creation of a "living toon" I call Maury the Mouse — it's useful to first present an overview of Organica itself.

The Organica Interface

To follow along in the tutorial later, it is essential that you understand the layout of the Organica interface and how various design tasks are performed. Knowing this, you will understand the various terms used when we detail the Maury-the-Mouse project. Of course, if you're already an experienced Organica user just skip ahead to the tutorial.

What is Organica

Organica is a 3D object-modeling environment, as well as a stand-alone rendering and animation application. Most professional users will want to model objects in Organica, and then port the resulting objects to 3D Studio, LightWave, Imagine, or save the objects out as DXF formats. More formats will no doubt be supported in later versions.

Organica calls itself a "MetaBlock" modeler, a take off on the term "MetaBalls". MetaBall modeling is familiar to most 3D art and animation pros. It is accomplished by using spherical surfaces to shape the underlying structure of a model. The spheres are sticky, meaning that they send out appendages based upon their distance from each other. The closer they are, the thicker the connecting appendages become. When a MetaBall model is saved, it is saved as a surfaced object. A "skin" is calculated over the spherical components, so that a smooth object with lots of detailed curvature is the result. Organica's "MetaBlocks" just takes this process one extra step. Instead of using only spheres, you can select from a long list of MetaBlock primitives. The result can easily become a complex super-curved organic looking form. Organica is thus very useful when it comes to generating human, animal, or other organic forms.

The Organica Interface

Impulse has designed Organica to be as easy and intuitive to use as possible. Feedback from users that have already installed it indicate that it is indeed easy to understand, and has a quick learning curve.

Take a look at Figure 1. This is the basic Organica interface. Notice the string of 25 MetaBlocks at the top, and the toolboxes along the left and right sides. With these 25 Metablocks, combined with Organica's Boolean operations, you can construct just about anything, as you can see in Figure 2.

Figure 3 shows the details of the left-hand toolbox. From A through L they are: Select, Delete, Hide, Paste, Move, Rotate, Resize, Axis selectors, In Place, Family Mode, Group Mode and Unselect Last.

Figure 4 shows the details of the right-hand toolbox. From A to N they are: Mesh Controls, Toggle AnimBar, Clone, Mirror, Make Same Color, Make Same Mesh Strength, Make Same Color Strength, Make Same Family, Group, Ungroup, Undo, Redo, Unhide, Rehide.

The interactive modeling display itself is separated into a "quad view" layout: Top, Front, Right, and a preview rendering view (top right). You can enlarge any quadrant to fill the view when needed. Models are designed using the Top, Front, and Right views, which show the MetaBlocks as separated elements. In the rendering preview window, the model is shown with the MetaBlocks skinned, so you get an idea of how close or far the separate MetaBlocks should be moved in the other three views to get the skinning you want. Notice that the skinned model, shown in the rendering preview at the upper right, always appears more unified than the placed components seen in the three design views.

From the One, Many

To continue with the basics, let's take a short journey to the land of deformations. In addition to being able to use any of the Organica MetaBlock primitives to build up a model, you can also deform them in several ways. The key to all of this is a MetaBlock's Properties dialog, brought to the screen by selecting it from the Edit menu, or by hitting the Enter key while the MetaBlock is selected. This is the most important modeling alternatives dialog in Organica. Alterations are immediately updated in the render preview window.

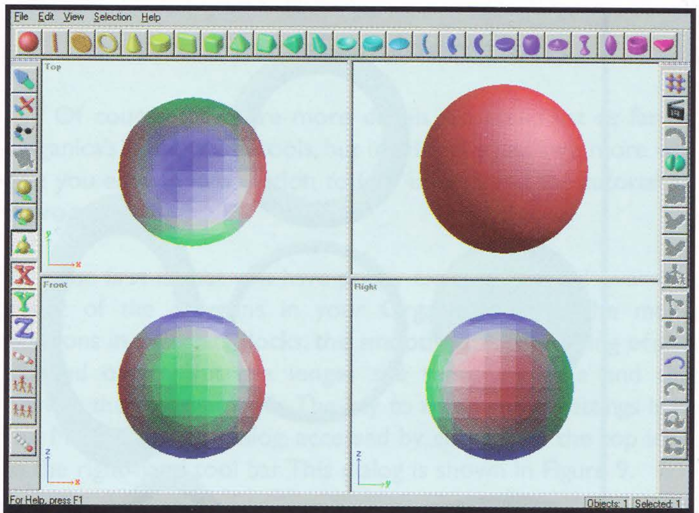

File
Edit
View
Selection
Help
Top
Front
Right
For Help, press F1
Objects: 1
Selected: 1

Figure 1. The basic Organica interface.

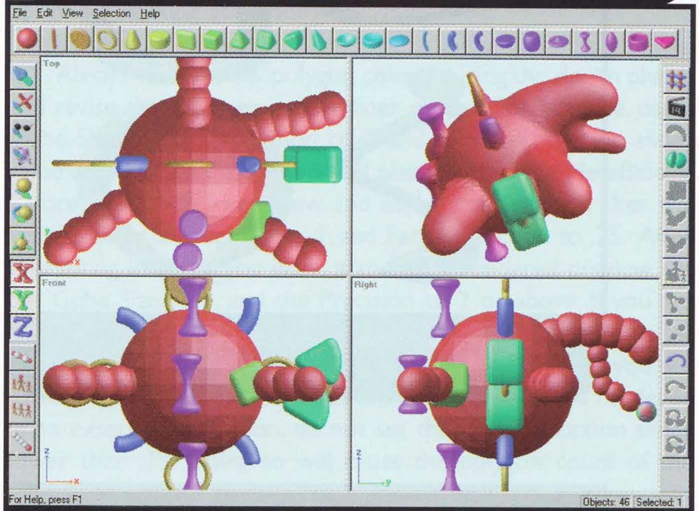

File
Edit
View
Selection
Help
Top
Front
Right
For Help, press F1
Objects: 46
Selected: 1

Figure 2. With the 25 MetaBlocks combined with Organica's Boolean operations, you can construct just about anything.

Figure 5 shows the tabbed areas of a selected MetaBlock's Properties dialog. These are, from top to bottom: Attributes, Shape, Deformation, More Deformation, and Position.

Here's what each of the settings in the Properties dialog tabs does:

Attributes: Select the color of the object from the system color palette. By colorizing an objects MetaBlock components, you can selectively paint it in 3D for internal Organica animations. Check "Subtractive" to make the MetaBlock a Boolean negative object that slices other objects in its influence perimeter. Set the influence perimeter by using the Mesh Strength slider, and set the power of its color influence by setting the Color Strength slider. Checking Disabled effectively removes the selected MetaBlock from the composition. Select a family name for the object, which ties it to other objects with the same family name.

Shape: The Shape tab is MetaBlock specific, that is, it lists different controls dependent upon the MetaBlock type that is selected. Some possibilities include Rounder (which forces the shape either towards or away from a sphere), Taller (with obvious implications), and Angle (which effects some angular component of the MetaBlock). There are other Shape modifiers as well, MetaBlock dependent.

Deformation: Stretch, Mirror, and Shear is controlled from here, applicable to any of the MetaBlock's axis.

More Deformations: taper, twist, and bend are applied under this tab. Not only can each be applied to any axis, but three checkboxes (dutifully named 1, 2 and 3) allow you to apply any selected modifier up to three times. This allows multiple axis modification, or applying the same modification up to three times on the same MetaBlock.

Position: Numerically repositions and realigns any MetaBlock, depending upon input.

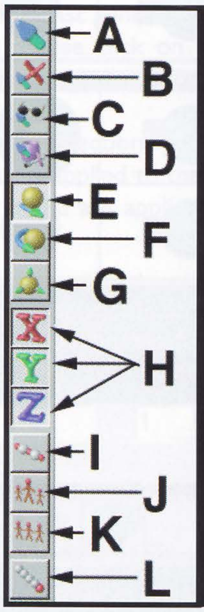

A
B
C
D
E
F
G
H
I
J
K
L

Figure 3. Details of the left-hand toolbox.

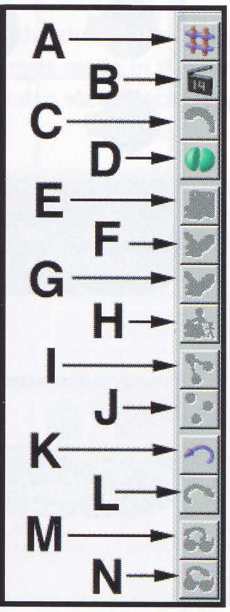
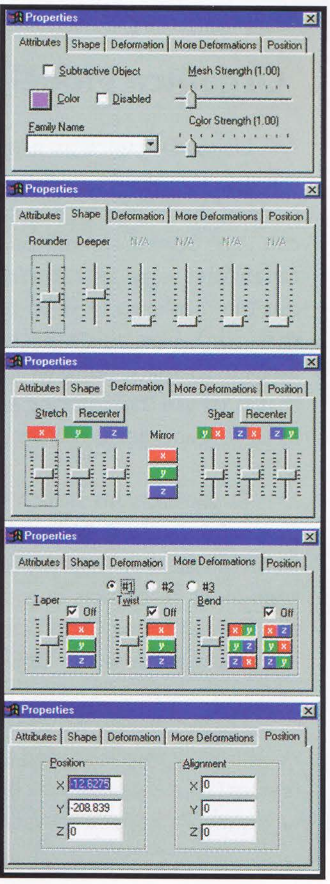

A
B
C
D
E
F
G
H
I
J
K
L
M
N

Figure 4. Details of the right-hand toolbox.


Properties
Attributes
Shape
Deformation
More Deformations
Position
☐ Subtractive Object
Mesh Strength (1.00)
Color
☐ Disabled
Family Name
Color Strength (1.00)
Properties
Attributes
Shape
Deformation
More Deformations
Position
Rounder
Deeper
N/A
N/A
N/A
N/A
Properties
Attributes
Shape
Deformation
More Deformations
Position
Stretch
Recenter
x
y
z
Mirror
x
y
z
Shear
Recenter
y x
z x
z y
Properties
Attributes
Shape
Deformation
More Deformations
Position
● #1
○ #2
○ #3
Taper
☑ Off
x
y
z
Twist
☑ Off
x
y
z
Bend
☑ Off
x y
y z
z x
x z
y x
z y
Properties
Attributes
Shape
Deformation
More Deformations
Position
Position
Alignment

Position

X -12.6275

Y -208.839

Z 0

Alignment

X 0

Y 0

Z 0

Figure 5. The tabbed areas of a selected MetaBlock's Properties dialog.

Figure 6 shows some examples of the power of the modification tools, found in the MetaBlock's Properties dialog. These are, from the top, left to right: Original MetaBlock (Torus), Rounder, UnRounder, Stretched on Y axis, Sheared on YX and ZX, Tapered on Y axis, Twisted on Y axis, and Bend on XY axis. You can, of course, combine any of these modifications and more.

Boolean Modeling Operations

We have already seen that by checking a MetaBlock as a Subtractive object in its Properties dialog, it becomes a cutter in the component mix. But in Organica, that's only part of the story. There are a number of ways you can modify exactly how and how much the Subtractive Boolean cuts away at other MetaBlocks in its vicinity.

For instance, your Subtractive Boolean MetaBlock acts very differently on objects in the vicinity when its Mesh Strength is altered. A Subtractive MetaBlock can cut into a surface at a good distance from another MetaBlock when its Mesh Strength is set to maximum. But it is only one partner in the dance. Other MetaBlocks in its power vicinity will also be effected according to their own Mesh Strength settings.

The series of screens in Figure 7 show how a Subtractive MetaBlock alters a normal MetaBlock as the Mesh Strength of the Subtractive MetaBlock is increased over time. This can be an interesting animation technique, as well as a definitive modeling method. In all cases, the blue sphere has a Mesh Strength of 2. The elongated cube has Mesh Strengths of 1, 2, 7 and 10. Notice that the subtractive MetaBlock grows a bit as its Mesh Strength increases.

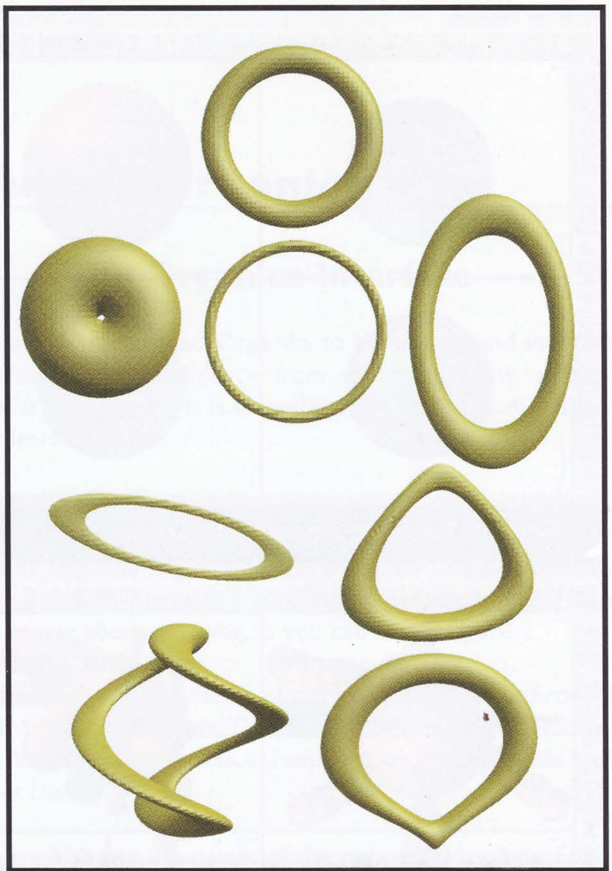


Figure 6. Examples of the power of the modification tools.

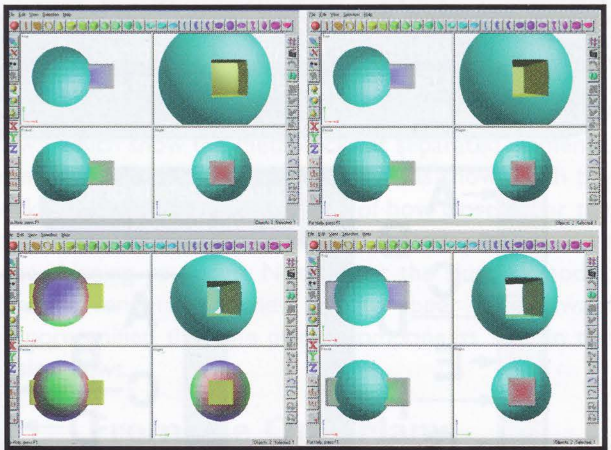


Figure 7. How a Subtractive MetaBlock alters a normal MetaBlock as the Mesh Strength of the Subtractive MetaBlock is increased over time.

Organica Modeler, Animator, or Both?

Using Organica as a modeling environment allows you to output 3D Studio, LightWave, or Imagine object files. After porting the model to one of those respective 3D applications, it can be boned, animated, and textured according to the capabilities each of those applications have. You can also write out the model to DXF so it can be imported by 3D applications that don't have the capacity to read 3D Studio, LightWave, or Imagine formats. But there is another alternative altogether, and that is to use the coloring and animation capabilities of Organica itself to generate an AVI movie.

Organica is no slouch when it comes to animation. It has a powerful, yet unbelievably simple, animation controller. Remember that you can map AVI movies or single frame sequences to objects in most 3D applications, so you could use the fast rendering Organica system to animate a model, and map it to a planar or other object in a different 3D application later.

The Animation module is extremely simple to use. Just click on the keyframe icon, and then on an empty cel. The number of frames you indicate will be the number of in-betweens from keyframe to keyframe. Figure 8 shows the module.

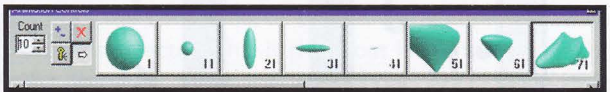


Figure 8. The Organica Animation module.

Two Final Considerations

Of course there are more details we could list as far as Organica's options and tools, but mentioning just two more will give you enough information to fully understand the tutorial as it progresses.

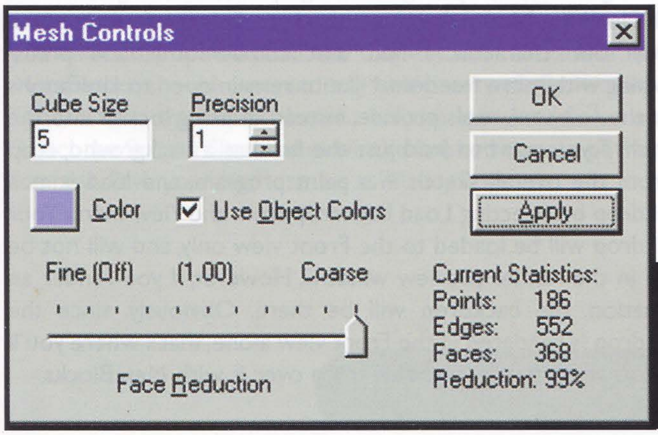
The first is that you have pretty exacting control over the count of the polygons in your Organica model. The more polygons in the MetaBlocks, the smoother the rendering of the skinned object, but the longer the rendering time and the heavier the storage needs. The key to these global settings is in the Mesh Controls dialog, accessed by clicking on the top icon in the right-hand tool bar. This dialog is shown in Figure 9.

How to configure the Organica Mesh Control settings for optimum working conditions:

Always work at low polygon counts during the design phase, and revise them last, to render finer output. For instance, use a Cube Size of 10, a Precision of 0, and a Face Reduction slider value of .50 when doing the initial placement of the MetaBlocks. Before rendering, to preview and adjust components, alter the Cube Size to 5, Precision to 1, and Face Reduction to .25. After everything looks as you want it to in the rendered preview, set the Cube Size to 1, and the Precision to 2 or above. If you are doing the rendering or animation in Organica itself, you can set the Face Reduction to Finer (.10 or even lower to 0). If you are exporting the meshed model to another format to be rendered in an external application, do not set the Face Reduction slider lower than .15. Doing so will cause the polygon count of the object to soar, and you will not enjoy the wait times for renders. Besides, most professional external applications have smoothing algorithms, so you can smooth out the meshed model without it having to have extreme polygon counts.

The last general Organica process to be aware of is that a right mouse click on any view, including the render preview, brings up a menu of options. See Figure 10.

Any selections you make in one of the three standard view menus is applied to the others, but changes made in the render view menu are applied only to the render view. Because your renders are based upon what you see in the render view window, it is important to get your camera just right here. You can interactively rotate and zoom the render view by selecting adjusting the Viewing Angle, Perspective, Zoom, and Centering. You have to become a master of using the controls offered in this menu for the render view window to get the pictures and/or animation you want to output from Organica.



Mesh Controls

Cube Size: 5

Precision: 1

☑ Use Object Colors

Fine (Off) (1.00) Coarse

Face Reduction

Current Statistics:
Points: 186
Edges: 552
Faces: 368
Reduction: 99%

Figure 9. Polygon count settings are fine tuned in the Mesh Control dialog.

OK. Now it's time to learn about how Organica can be used to shape a specific 3D model. I hear Maury calling...

Maury: the Organica Mouse

There's more to the world of toon-mice than Mickey, though he remains the marsupial archetype recognized the world over. The most telling rules for creating any original cartoon character is that the final character has to stand out from similar, or even remotely connected, toon personalities. There are several ways to distinguish your toon beings from anyone else's, and these principles were all essential in Maury's design.

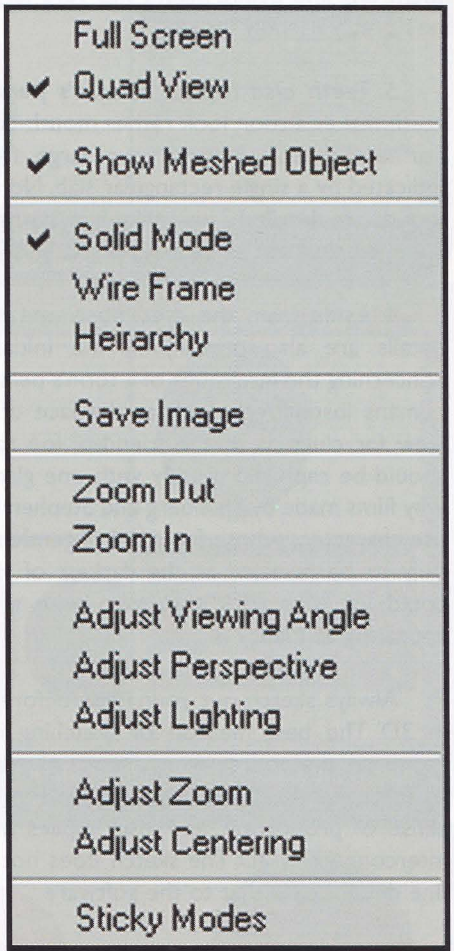


Figure 10. A right mouse click in any view, including the render preview window, brings up a number of important view adjustment options.

Some thoughts behind Maury:

1. Take one or more physical characteristics and exaggerate them past the boundary of realism. For instance, if a mouse character has really big ears, make them even bigger, perhaps by 200%. Follow this same principle with other body parts, but take care not to alter everything or the exaggeration of needed identifiable parts will have no effect. For instance, Maury has exaggerated ears and feet.

2. Add an identifiable prop or two that assures the audience this is meant to be a toon. This can be a hat, glasses, or other clothing — anything that says "this is not really a mouse as we know it." Maury has a bow tie and a hat.

3. Add a color or colors that identify the mouse as more than ordinary. Maury has a bright green nose, and a gradient tail that goes from pink to blue.

4. The eyes have it. Always make the eyes of a toon a first-order aspect of the toon's personality. If the character is a friendly personality, make the eyes big and soft. If villainous, make them tiny and beady. Maury has very large eyes, so as mice go he's pretty friendly looking.

5. Teeth also reflect a toon's personality. Detailing the teeth makes a toon look rather mouth-centered and voracious. For this reason, Maury's two large front teeth have been indicated by a single rectangular slab. No other teeth in Maury's mouth are detailed. This is like him saying. "Yep, I have some big choppers, but not to worry, I won't bite you."

6. Aside from the eyes, nose, and mouth, all other facial details are also primary in the initial impression we get concerning the intentions of a toon's personality. This is because humans instinctively look at the face of whoever comes into view for clues as to the friend-or-foe nature. A toon's nature should be captured quickly with one glance at the face. This is why films made by Spielberg and Stephen King are so scary; they use characters whose faces tell of gentle and warm personages, only to be revealed as the darkest of villains. Of course, you could use this trick too, even with a character as friendly appearing as Maury is.

Always sketch out your ideas before trying to shape them in 3D. The best method of sketching is the tried and true "spheres" method, drawing a series of overlapping basic spheres to form the character as you see in Figure 11. This gives you a sense of proportion, and also implies how the elements will interconnect in 3D. The sketch does not have to have a lot of fine detail. Leave that to the software.

Though the sketch is an important first step, never be so attached to the sketch that you can't alter it with the 3D software if other better ideas come to pass from your explorations. Of course, if the sketch was created by another artist, or if you are at the beck and call of an art director, then you'll have to make the model resemble the sketch as close as possible. Or at least you'll have to inform the art director or client what you're doing, and why.

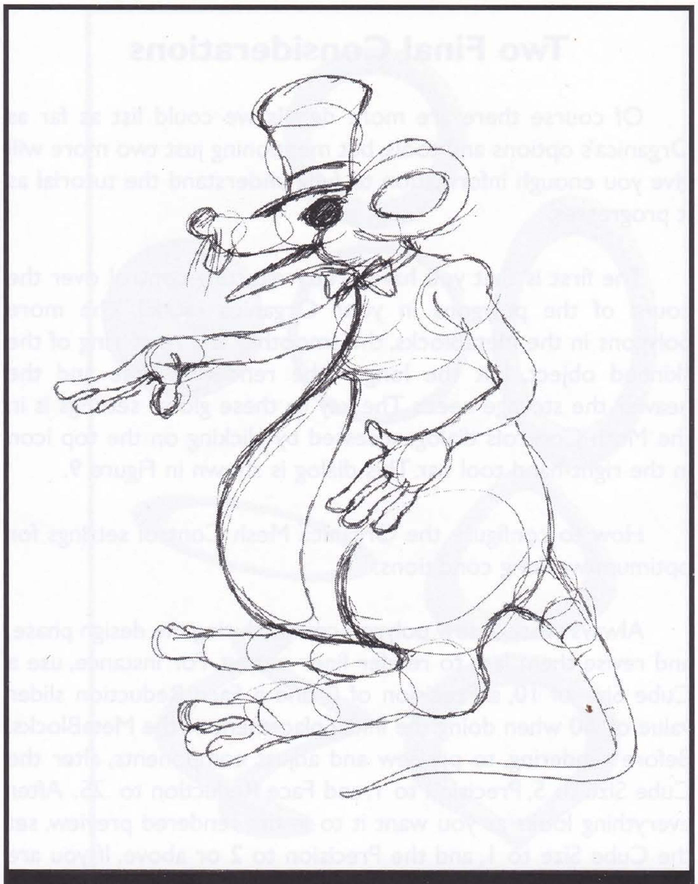


Figure 11 The first step is a general sketch of the subject.

The Head With Class

We're going to focus upon the Organica construction of Maury's head in this article. Get comfortable, and let's get started.

Step #1: The Ears

We're going to work in the Right or profile view most of the time. That's the view located on the bottom right of the quad-view layout.

Organica allows you to load a graphic as a background. We could load the Maury sketch as a background to reference as we model our character. I find that cumbersome, and prefer working with more freedom. I like to remain open to alterations that the software tools provide, instead of being locked into the sketch. If you want to load just the head as a background, crop it from the overall sketch in a paint program, and load it as a backdrop by selecting Load backdrop from the View menu. Your backdrop will be loaded to the Front view only, and will not be seen in the render preview window. However, if you render an animation, the backdrop will be there. Obviously, since the backdrop is rendered in the Front view alone, that's where you'll have to work if you intend to trace over it with MetaBlocks.

Since we're not going to use a traceable backdrop we'll start to shape our model from scratch, beginning with Maury's ears. Each ear is constructed from five specific MetaBlocks. Do the following:

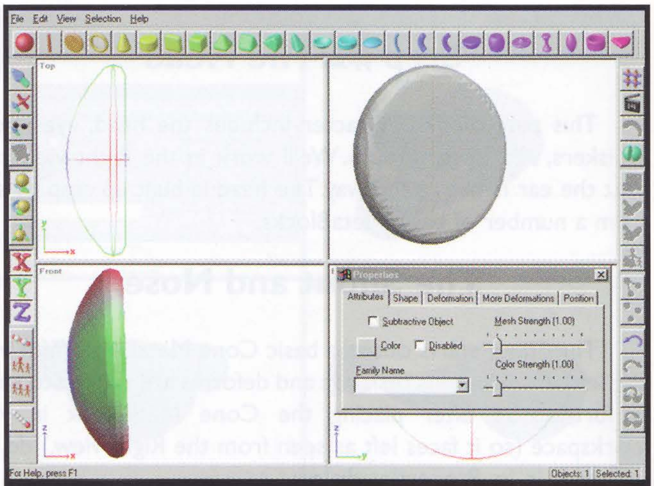
1. Add a Sphere Slice MetaBlock (7th MetaBlock from the right in the top bar). Zoom in twice to get a better view. Rotate the Sphere Slice 90 degrees to the left in the front view (on the Y axis). In the Sphere Slice's Properties dialog, set its color to RGB = 190, 190, 190. This gives us a nice medium gray. In Mesh Controls, set the Cube Size to 4, leaving the other settings at their default for now. Use Adjust Viewing Angle in the render preview to turn the ear so you can see it at about a 45 degree angle. You should have a screen that resembles that shown in Figure 12.

2. Load a Convex MetaBlock, and in its Properties dialog, set the RGB color to 250, 20, 50. Set its Mesh Strength at 0, and its Color Strength at 10. This makes the Convex MetaBlock a paintbrush, with no ability to warp any other MetaBlock. Rotate it in the same orientation as the Sphere Slice, and move it a little to the left as seen in the Front view. Note that the Convex MetaBlock is invisible in the render preview. Your screen should look like the one portrayed in Figure 13.

3. Now, as seen from the front view, add a Sphere MetaBlock to the composition. Move it to the right of the Convex MetaBlock, as seen from the Front view. Turn its Color Strength to 0, and set its Mesh Strength to 5.5. Make it a Subtractive element. This is a Boolean cutter, and it has no influence on color. See Figure 14.

4. Now it's time to move things to create the final ear model. Using the Front view, move the Convex MetaBlock so that it sits half inside the Sphere Slice. Now move the Subtractive MetaBlock to the left, until you see it cutting into the Sphere Slice MetaBlock in the render preview forming a bowl. Adjust the placements as necessary. In the final result, you should see a bowl shaped structure in the render preview, whose inside is colored a reddish pink. That's our ear. See Figure 15. On the left is the Front view, while the preview render is on the right.

Click on the elements in order while holding down the Shift key: The Sphere Slice, the Convex, and then the Sphere MetaBlock. Group them by selecting "Group" from the Select menu. Activate the Group mode in the left-hand toolbar. When you select the Sphere Slice, the Convex and subtractive Sphere MetaBlocks should automatically select as well. By moving the Sphere Slice, the other elements of the ear should also move. Select the Sphere Slice and move the finished ear out of the way for now. Save your work so far as Maury1.ogc .


File
Edit
View
Selection
Help
Top
Front
Properties
Attributes
Shape
Deformation
More Deformations
Position
For Help, press F1

☐ Subtractive Object

Mesh Strength (1.00)

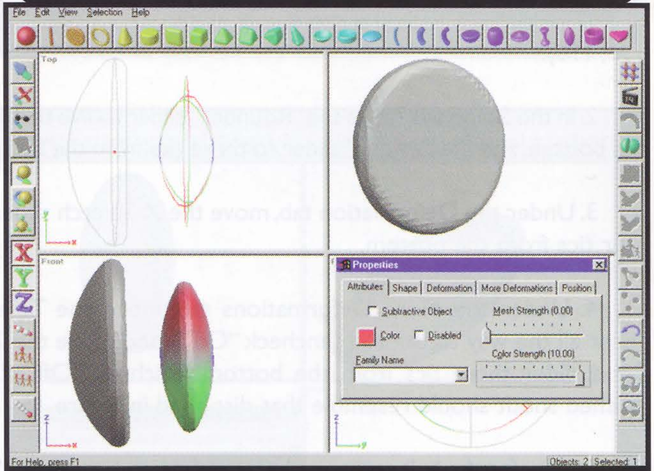
Color ☐ Disabled

Color Strength (1.00)

Family Name

Objects: 1 Selected: 1

Figure 12. The beginning of Maury's ear.


File
Edit
View
Selection
Help
Top
Front
Properties
Attributes
Shape
Deformation
More Deformations
Position
For Help, press F1

☐ Subtractive Object

Mesh Strength (0.00)

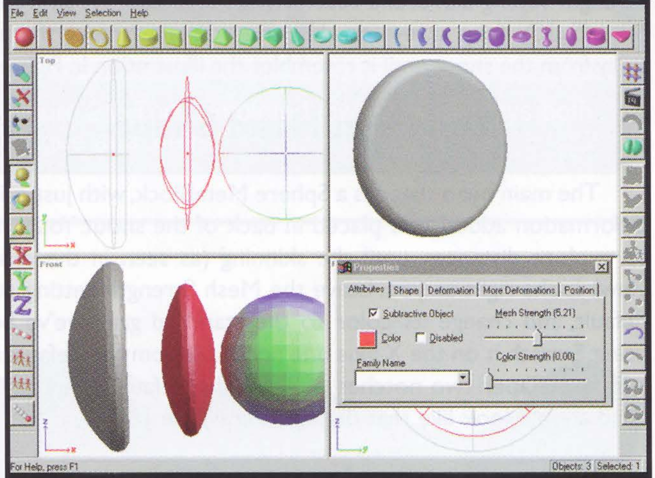
Color ☐ Disabled

Color Strength (10.00)

Family Name

Objects: 2 Selected: 1

Figure 13. With the Convex MetaBlock in place, your screen should look like this.


File
Edit
View
Selection
Help
Top
Front
Properties
Attributes
Shape
Deformation
More Deformations
Position
For Help, press F1

☑ Subtractive Object

Mesh Strength (5.21)

Color ☐ Disabled

Color Strength (0.00)

Family Name

Objects: 3 Selected: 1

Figure 14. With the three objects in place, your scene should look like this.

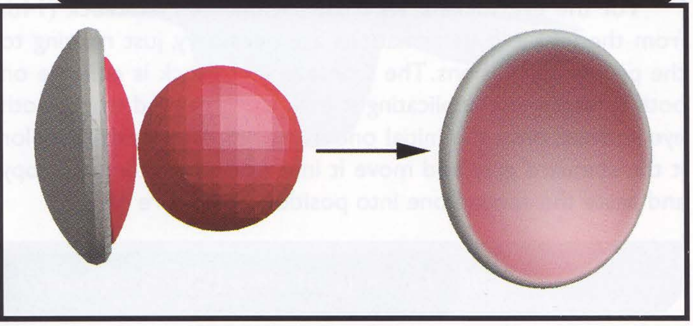


Figure 15. The finished ear.

Step #2: The Head

This part of the character includes the head, eyes, nose, whiskers, and lower mouth. We'll work in the Right view now that the ear is out of the way. The head is built up step by step from a number of basic MetaBlocks.

The Snout and Nose

The Snout starts out as a basic Cone MetaBlock (fifth from the left). Then various resizings and deforms are applied to shape it further. So after placing the Cone MetaBlock in your workspace (so it faces left as seen from the Right view,) do the following in its Properties dialog:

1. Colorize it with the same gray as the ears (RGB = 190, 190, 190).

2. In the Shape tab, move the "Rounder" slider to five tics from the bottom, and the "Wider" slider to three tics from the bottom.

3. Under the Deformation tab, move the X-Stretch slider to four tics from the bottom.

4. Under the More Deformations tab, move the Taper-X slider all the way to the top (uncheck "Off"), and move the ZX-Bend slider three tics from the bottom (uncheck "Off"). The finished snout should resemble that displayed in Figure 16.

5. Now for the bulbous nose. Create a Sphere MetaBlock. Size it to about half of the dimensions it comes in with. Leave its Strength setting alone, and recolor the Nose dark green (RGB = 50, 145, 30). Keep an eye on the render preview. Move the nose away from the snout until it resembles the illustration in Figure 17.

The Main Head Shape

The main head shape is a Sphere MetaBlock, with just a little deformation added. It is placed in back of the snout. You'll have to explore distances, until the skinning (as seen in the render view) looks right to you. Leave the Mesh Strength setting at its default, and change its color to the standard gray we've been using. Stretch it on the X axis one notch up from the default, and add an X Taper two notches up from the default. The attached head should look like that displayed in Figure 18.

Eye Sockets and Eyes

For the eye sockets, we'll use a Concave MetaBlock (14th from the left). No deformations are necessary, just resizing to the proper dimensions. The Concave MetaBlock is concave on both sides, so just duplicating it is all that's needed to get both eye sockets, once the initial one is resized. After resizing, color it the standard gray, and move it into position. After that, copy and paste the second one into position. See Figure 19.

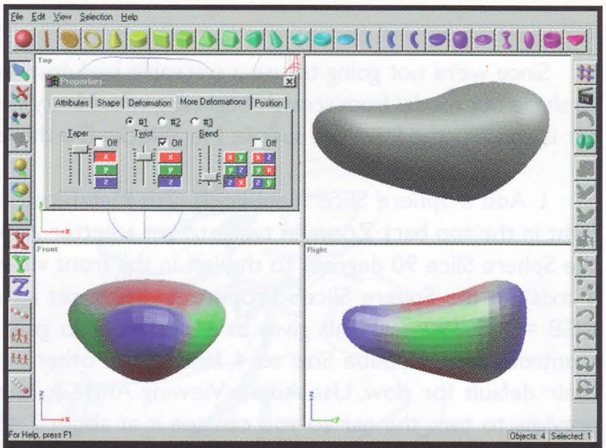

File Edit View Selection Help
Properties
Attributes Shape Deformation More Deformations Position
#1 #2 #3
Taper Twist Bend
Off
Top
Front
Right
For Help, press F1
Objects: 4 Selected: 1

Figure 16. After customizing the Cone MetaBlock, the snout appears very organically sculpted.

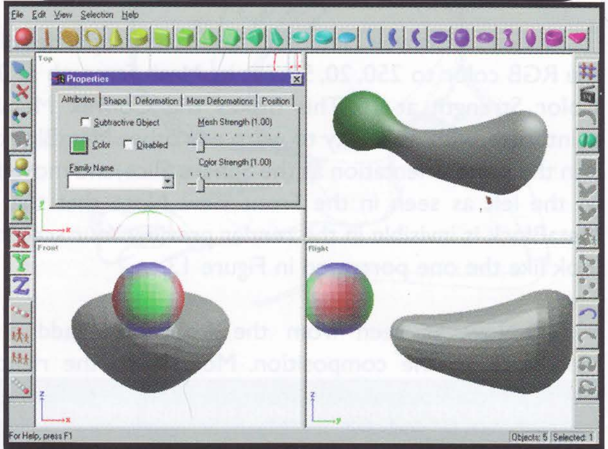

File Edit View Selection Help
Properties
Attributes Shape Deformation More Deformations Position
Subtractive Object
Mesh Strength (1.00)
Color
Disabled
Family Name
Color Strength (1.00)
Top
Front
Right
For Help, press F1
Objects: 5 Selected: 1

Figure 17. The nose is part of the snout.

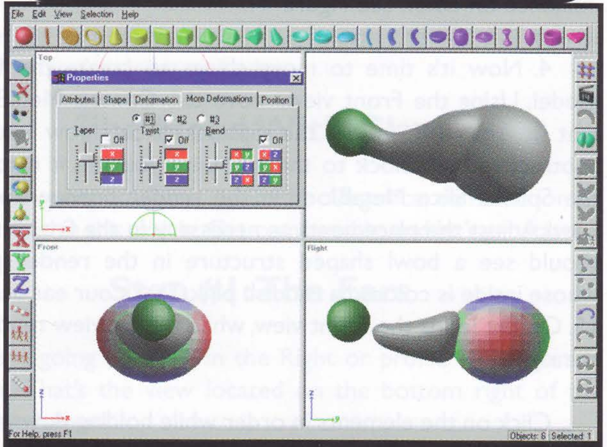

File Edit View Selection Help
Properties
Attributes Shape Deformation More Deformations Position
#1 #2 #3
Taper Twist Bend
Off
Top
Front
Right
For Help, press F1
Objects: 6 Selected: 1

Figure 18. The head is now attached.

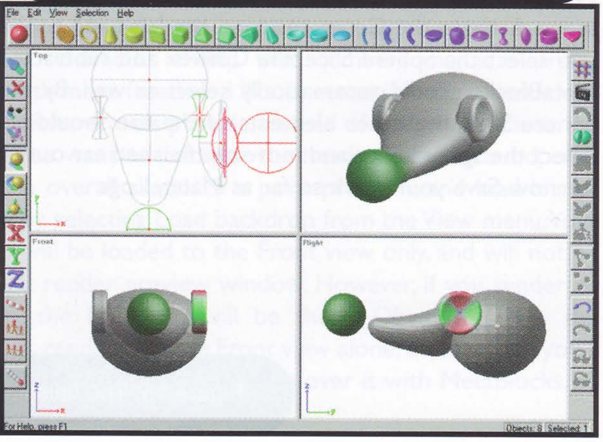
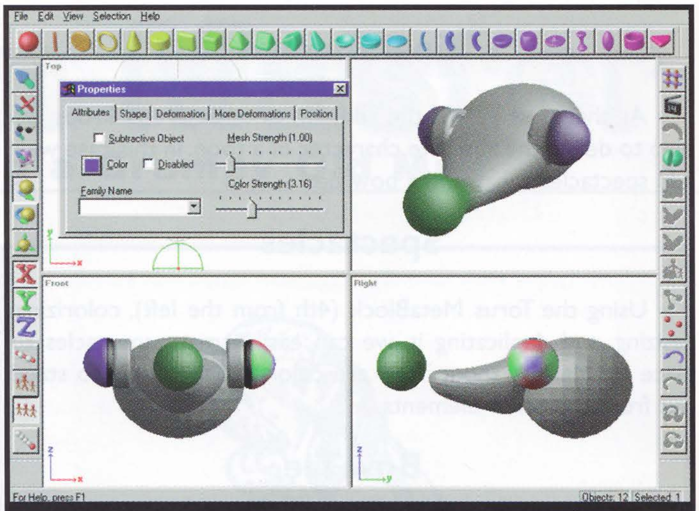

File Edit View Selection Help
Top
Front
Right
For Help, press F1
Objects: 8 Selected: 1

Figure 19. The eye sockets are ready for the eyes.

Now for the eyes. The eye starts out as a Sphere Slice (7th MetaBlock from the right). It's shaped like a button, so it can be placed in the socket very neatly. If we had used a Sphere, the Sphere would have to be embedded in the socket, leading to problems with Mesh Strength settings and colorizing. Once rotated into the correct orientation, the eye is colored blue-black. We add just a touch of Stretch elongation to the eye, three tics on its Z axis. Now for a special technique: doubling a MetaBlock in place (or close to in place). This adds double the Mesh and Color Strength, and also allows the object to be more stand-alone, so its neighbors are unaffected by the placement. The initial eye is doubled, and the outer part is moved slightly away from the inner copy. This allows us to select both and group them. After that, the initial eye group is copied and pasted, then mirrored on its X axis and moved into position on the other side of the head. See Figure 20.


File Edit View Selection Help
Top
Front
Right
Properties
Attributes | Shape | Deformation | More Deformations | Position

☐ Subtractive Object
Color ☐ Disabled
Family Name
Mesh Strength (1.00)
Color Strength (3.16)

For Help, press F1
Objects: 12 Selected: 1

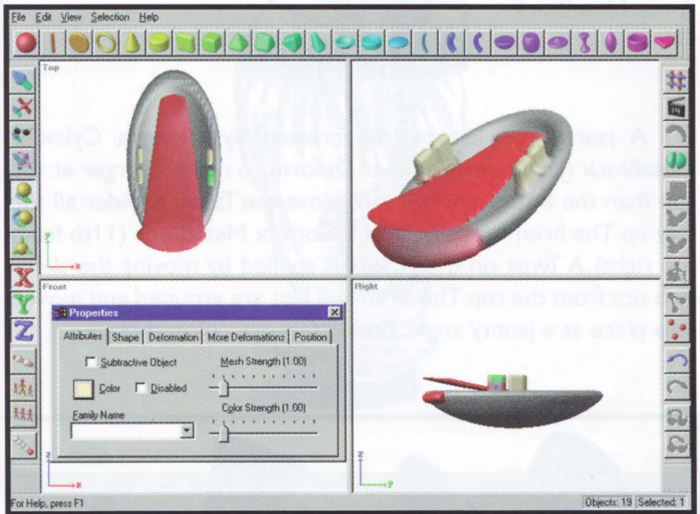
Figure 20. The eyes are set in place.

The Lower Jaw, Tongue, and Teeth.

With the head we just put together moved out of the way, we're ready to construct the lower jaw. We'll use a Bowl MetaBlock (13th from the left) for the basic structure, colored gray. In the Properties dialog under the Shape tab, the Rounder setting is three tics up, and Deeper is seven. Under the Deformation tab, it's Stretched on the Y axis by three tics up from the default.

The Tongue, colored red of course, is constructed from a bent Cylinder MetaBlock (nine from the right). It undergoes serious deformation in order to be identifiable as a tongue. Under the Deformation tab, it is Stretched all the way down on the X axis, and all the way upon Y and Z. It also undergoes a Bend deform on the ZY axis, with the slider moved up two tics from the top. It is then rotated and placed in the back of the jaw, protruding upward and out.

We place four teeth in the lower jaw, each cloned from one Rectangle MetaBlock (7th from the left). The original is resized to fit the lower jaw, and deformed under the Shape tab by moving the Longer slider to four tics from the top . Finaly, a Bent Cylinder MetaBlock is sized and rotated, and put into place as a pinkish lower lip. Selecting the bowl of the jaw first while holding the Shift key down in Group mode, all of the other lower jaw parts are selected in turn, with the tongue last. Everything is grouped. This allows for the movement and rotation of the lower jaw as a whole by just selecting the bowl part. The tongue is added to the group last, because that way when it is selected, it can be moved independently, adding more animation possibilities. See Figure 21 for a view of the completed lower jaw.


File Edit View Selection Help
Top
Front
Right
Properties
Attributes | Shape | Deformation | More Deformations | Position

☐ Subtractive Object
Color ☐ Disabled
Family Name
Mesh Strength (1.00)
Color Strength (1.00)

For Help, press F1
Objects: 19 Selected: 1

Figure 21. The completed lower jaw displays both tongue and teeth.

Tooth Coloring

Always add a little yellowing to teeth, as it makes them appear more ivory and real. The same tooth idea is used to create a tooth for the upper jaw — one tooth that suffices for two large upper front teeth. The final head part is the neck, which is simply placed as a Barrel MetaBlock (6th from the right). It is resized and angled until it looks right. See Figure 22.

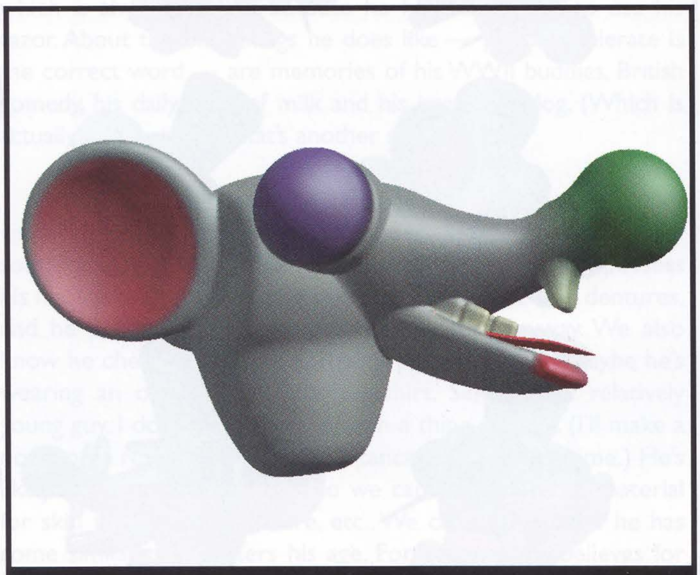


Figure 22. The head with the neck attached.

Final Touches

All that's left now is the addition of three props. Props can help to define the absolute character of a toon. In this case we'll add spectacles, a hat, and a bow tie.

Spectacles

Using the Torus MetaBlock (4th from the left), colorizing, resizing, and duplicating it, we can easily create spectacles to place on Maury's snout. They are colored a light blue to stand out from the other elements.

Bow Tie

Using two mirrored Pyramid MetaBlocks (9th from left), the bow tie is constructed. Resize it according to your tastes, group the halves, and put it in place. The Bow tie band is a torus MetaBlock.

The Hat

A jaunty top hat can be created by taking a Cylinder MetaBlock (), and using a Taper Deform to make it larger at the top than the bottom. To do this, move the Taper X slider all the way up. The brim is made up of a Convex MetaBlock (11th from the right). A Twist on the X axis is applied by moving the slider two tics from the top. The Brim and Hat are grouped and moved into place at a jaunty angle. Both parts are colored black.

Whisker or Moustache?

The whiskers that are added can also serve as a mustache, adding a final character touch to the model. Is Maury about to go club hopping? Maybe. The Whisker is shaped from a bent Rod MetaBlock (10th from the right). Using the Bend deformation on the XZ axis pair, and moving the slider all the way to the top then deforms it. This gives the whisker/mustache a thinner dimension at the tip than at the base. This is then colored black, duplicated and mirrored, and both halves are then set into position.

Maury's head is now finished. See Figures 23 and 24.

Please see the expanded version of this article in Serious Publishing Group's new book *Modeling 3D Living Toons*, by Bill Fleming.

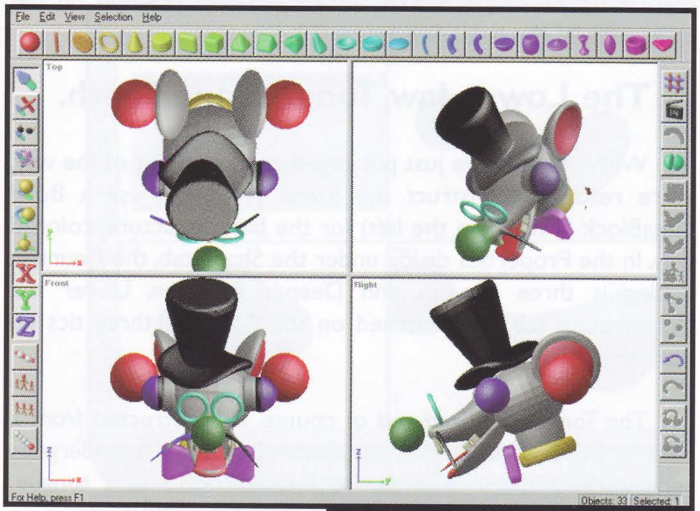


Figure 23. Notice the differences between the render view and the other views.

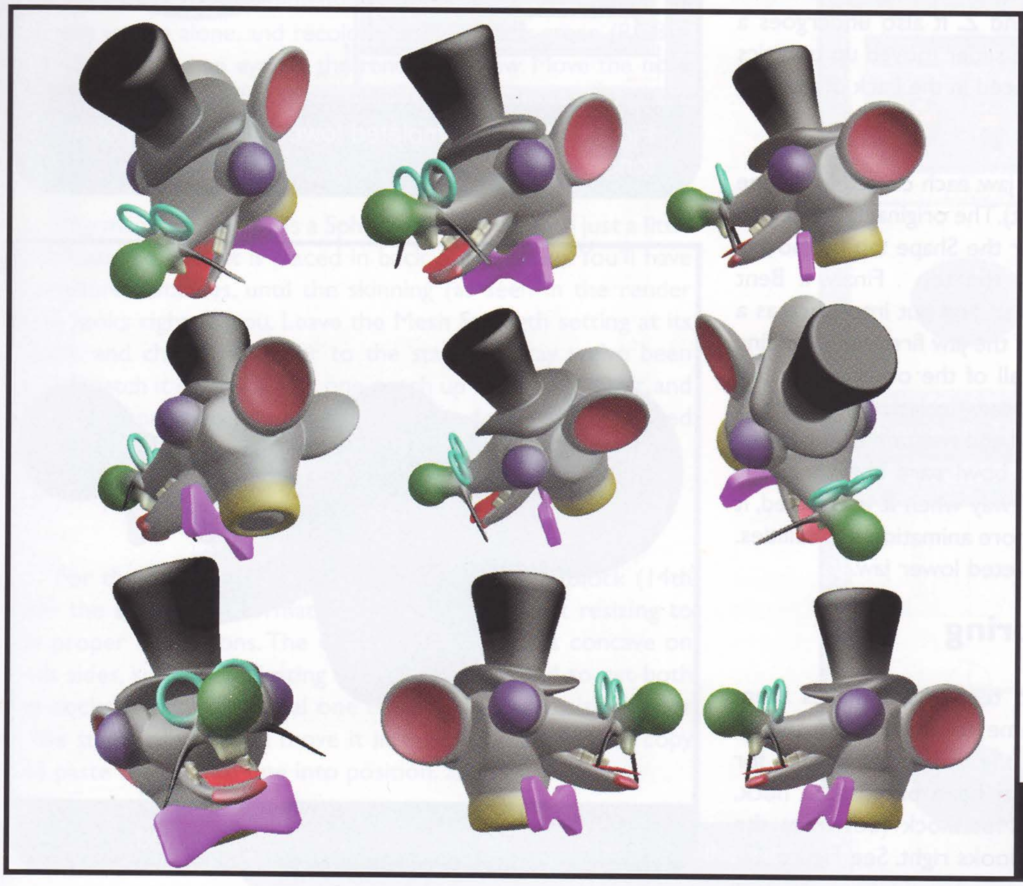


Figure 24. Alternate views of Maury's head.

Animation Master

Living Toons: Modeling a Grumpy Old Man

By Robert Ward

This tutorial is a fairly advanced one in that it assumes not only a basic understanding of splines and patches, but also that you've already built a few characters yourself. If not, there are many resources available these days to help you get to that point including many tutorials and descriptions on the internet, (you can try the tutorial links at http://www.hash.com/users/jsherwood/ to start), The Animation Master Handbook by Jeff Pares or the 3D Creature Workshop by Bill Fleming — in addition to the standard Hash manual.

One other thing that needs to be mentioned: much use is made of 5 point patches in this tutorial. These were unavailable in AM prior to v.6.1 (AM98), so if you wish to follow this tutorial with an earlier version, you can consult one of the above mentioned resources, all of which contain discussions on building meshes without them.

Okay, we're going to move fairly rapidly through the construction of the mesh, then spend a bit of time exploring how our character might be surfaced.

Exploring the Character

Before we jump into laying down splines, let's consider briefly just whom or what it is we'll be modeling. This is an important step in the modeling process — consider it part of the design phase. Of course it's always fun to just start aimlessly laying down splines and see what you can come up with, but then you end up with a model on your hard drive. It's much better to end up with a character, complete with history and personality. Another point to consider is that you may find yourself working under an art director, whose designs you will be modeling, with little or no improvisation. (No one said that art director won't be you, but the point still stands.)

Who is Grumps?

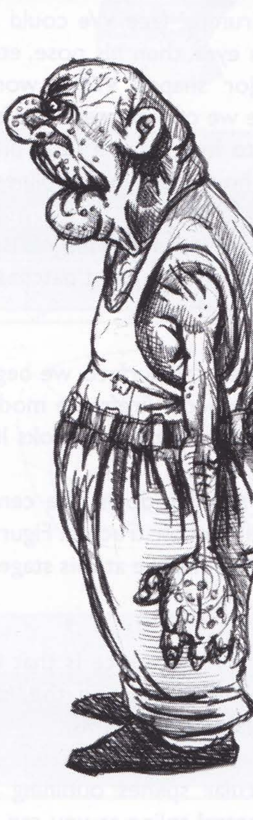


Figure 1 Concept Sketch of Grumps.

Grumps is the nickname given to him by his neighbors and acquaintances because nobody really knows much about him except that he's grumpy. His children do come to visit on occasion, but to the people in Grumps' building, they're simply referred to as 'those poor kids of his,' and no one dares speak to them because not a single, good word comes to mind when Grumps is the topic of conversation. Ok, so we know he's grumpy. But let's go out on a limb here and say that he's the reigning champion of grumpiness in our time. He hates nearly everything you can think of, from his apartment, the people who share the building with him, the rug in the hallway leading to his door, to the kid who delivers the paper and the kitchen sink where his hateful dentures soak. He especially despises the stubble on his chin, which is always present because he hates so much to use his razor. About the only things he does like — possibly tolerate is the correct word — are memories of his WWII buddies, British comedy, his daily glass of milk and his imaginary dog. (Which is actually a real rat, but that's another story.)

With this information in hand we can begin to develop a visual idea of Grumps. Figure 1 shows a sketch working out some of these ideas. For instance, we know he doesn't possess his natural teeth, because we've already mentioned his dentures, and he probably hates going to the dentist anyway. We also know he cherishes his memories of the Big War, so maybe he's wearing an old army surplus tee-shirt. Since I'm a relatively young guy, I don't even know if such a thing existed. (I'll make a note to go research it if its importance warrants the time.) He's likely in his mid to late 80's, so we can find reference material for skin type, bone structure, etc.. We can also assume he has some similarity to others his age. For instance, he believes for some reason that his waist line is just below his ribcage.

Building the Mesh

Now that we know a little bit about Grumps, let's get started modeling him.

Building Grumps' Face

We'll begin with Grumps' face. We could start by building his mouth first, then his eyes, then his nose, etc. But let's begin by laying out the major shapes. We're working without a template here, and since we only possess one 'side view' sketch of Grumps, we'll have to improvise a little bit to get started. Look at figure 2 to see how these initial splines are laid down.

Next we patch these splines up. This job is made much less worrisome with the addition of 5 point patches. Look closely at figure 3 and you'll see 8 of these.

Once we have created the surface, we begin sculpting it in 3 dimensions. Turn on Shaded/Wireframe mode to check your work if you wish. You can see what this looks like in figure 4.

Now add a spline running down the center of the large hole where his nose will be constructed. Figure 5 clarifies this, as well as what the mesh looks like at this stage from both front and side views.

One additional thing you'll notice is that the bridge of his nose has been widened by increasing the magnitude of the horizontal splines. Go ahead and do this.

Now add two circular splines outlining his nostrils, and connect these to the central spline as you can see in figure 6.

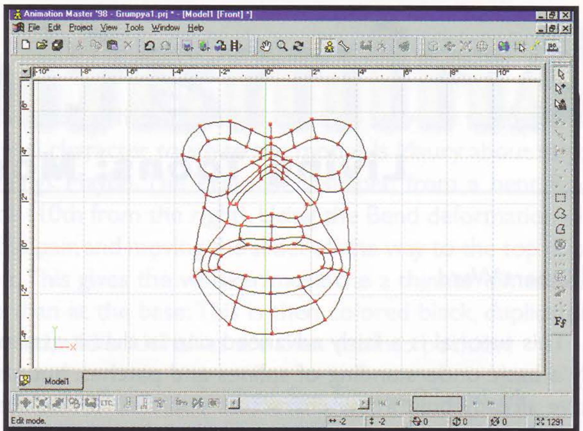

Animation Master '98 - Grumpya1.prj * - [Model1 [Front] *]
File Edit Project View Tools Window Help
Model1
Edit mode.

Figure 3 Patch the face splines.

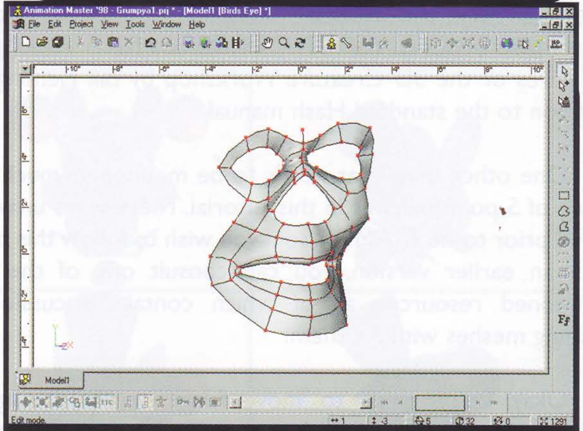
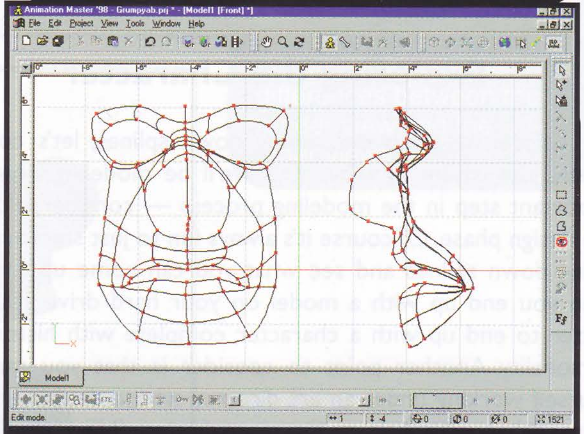

Animation Master '98 - Grumpya1.prj * - [Model1 [Birds Eye] *]
File Edit Project View Tools Window Help
Model1
Edit mode.

Figure 4 Form the face splines in 3 dimentions.


Animation Master '98 - Grumpyab.prj * - [Model1 [Front] *]
File Edit Project View Tools Window Help
Model1
Edit mode.

. Figure 5 Front and side views of the mesh with new nose Spline.

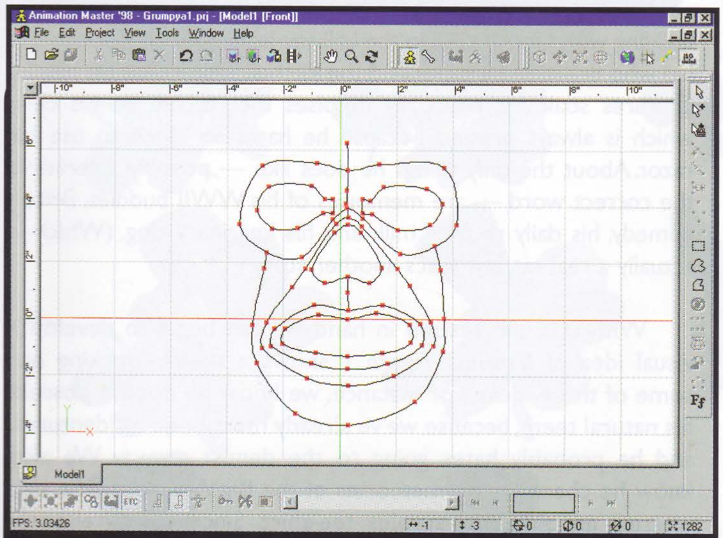

Animation Master '98 - Grumpya1.prj - [Model1 [Front]]
File Edit Project View Tools Window Help
Model1
FPS: 3.03426

Figure 2 Trace the major shapes of the face.

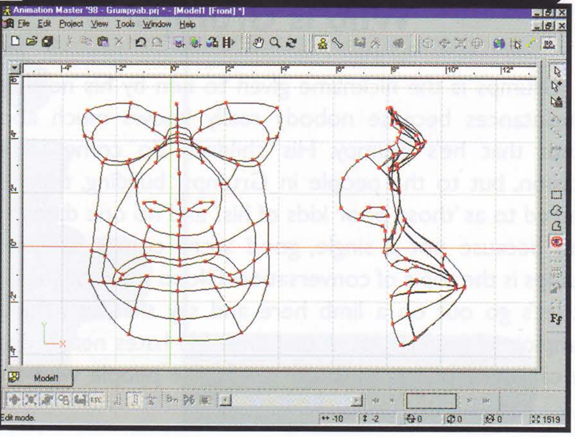

Animation Master '98 - Grumpyab.prj * - [Model1 [Front] *]
File Edit Project View Tools Window Help
Model1
Edit mode

Figure 6 Spline the nostrils.

Now we'll actually build the nose around these splines. Figure 7 shows the layout of this mesh, and Figure 8 shows the final sculpted nose.

Next construct the eye holes by extruding and scaling down the existing circular spline outlining the eye. Enough extrusions are necessary to form the eyelids and allow blinking. Figure 9 shows this work completed. Repeat this for the opposite eye.

Now that we have the bulk of the facial feature constructed, let's form the rest of Grumps' head. First, build a continuous spline encircling the entire face, and attach it to the face mesh as you see in Figure 10. Note that 5 point patches were utilized at the temples in two places.

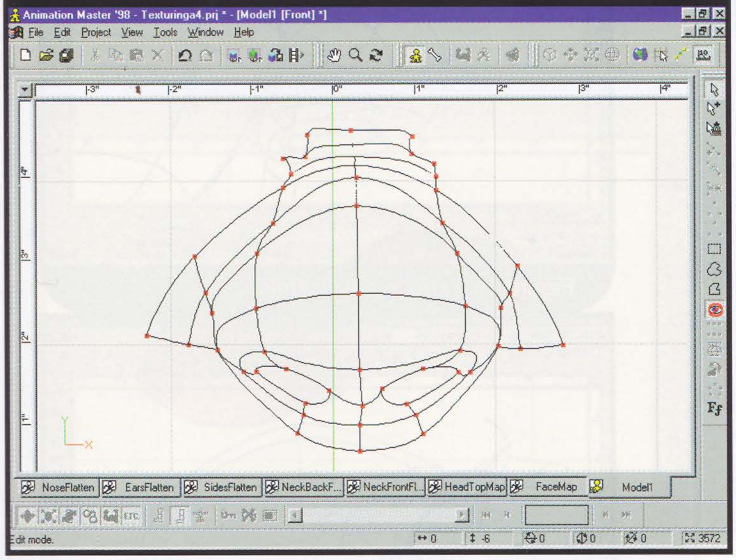
Now extrude this outer circular spline a number of times to form and sculpt the head as you see in Figure 11. I strongly recommend sculpting each extrusion as you go, rather than extruding 7 times, then sculpting. The reason I say 7 is because I counted them after I completed this process; if I were to guess before hand how many the head would need, I would have no idea.

Now let's build Grumps' ears and attach them to his head.

Building Grumps' Ears

We'll begin by laying down the mesh, flat in the side view, as you see in Figure 12. Notice that the outer ring is a continuous spline- this is necessary because we'll be extruding this to form the back of the ear. Also note where the 5 point splines are located. Go ahead and recreate this mesh.

Figure 7 The layout of the nose mesh.


Animation Master '98 - Texturinga4.prj * - [Model1 [Front] *]
File Edit Project View Tools Window Help
NoseFlatten
EarsFlatten
SidesFlatten
NeckBackF...
NeckFrontFl...
HeadTopMap
FaceMap
Model1
Edit mode.

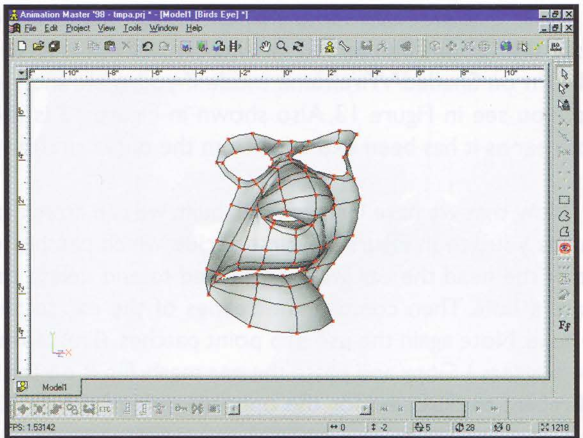

Animation Master '98 - tmpa.prj * - [Model1 [Birds Eye] *]
File Edit Project View Tools Window Help
Model1

Figure 8 The sculpted nose.

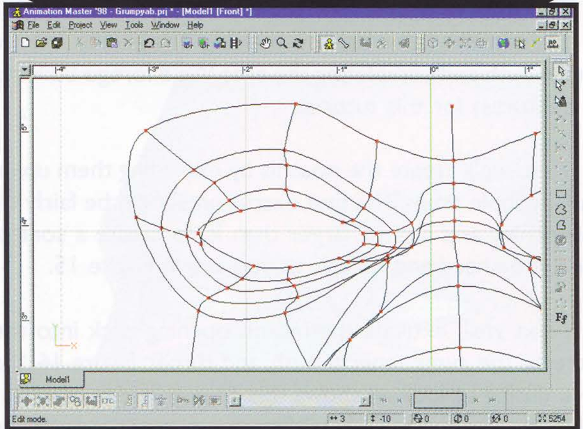

Animation Master '98 - Grumpyab.prj * - [Model1 [Front] *]
File Edit Project View Tools Window Help
Model1
Edit mode.

Figure 9 Construct the eye holes.

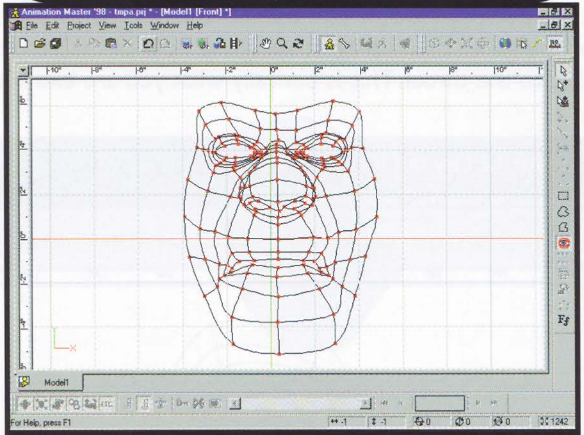

Animation Master '98 - tmpa.prj * - [Model1 [Front] *]
File Edit Project View Tools Window Help
Model1
For Help, press F1

Figure 10 Build a continuous spline encircling the face.

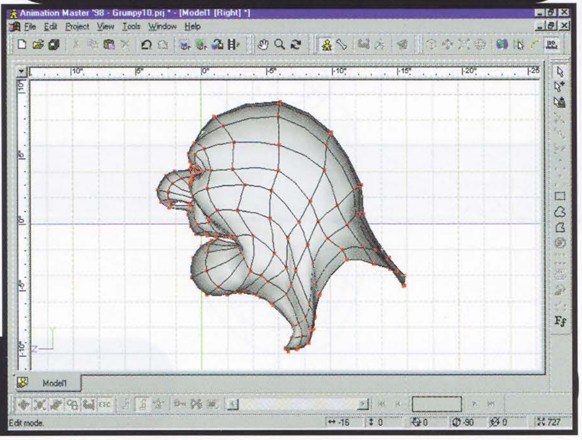

Animation Master '98 - Grumpy10.prj * - [Model1 [Right] *]
File Edit Project View Tools Window Help
Model1
Edit mode.

Figure 11Extrude the outer spline to form the head.

Now that we have some shapes, we can pull them out to create the various bumps and indentations of the ear. Go ahead and turn on Shaded/Wireframe mode if you wish, and recreate what you see in Figure 13. Also shown in Figure 13 is the back of the ear as it has been extruded from the outer circular spline.

Now that we have Grumps' ear built, we can attach it to his head as you see in Figure 14. First decide which patches on the side of the head the ear will be attached to and delete them to create a hole. Then connect the splines of the ear to those of the head. Note again the use of 5 point patches. (I just love those little buggers.) Copy and paste the ear mesh, flip it on the X axis and repeat the process for the opposite side of the head.

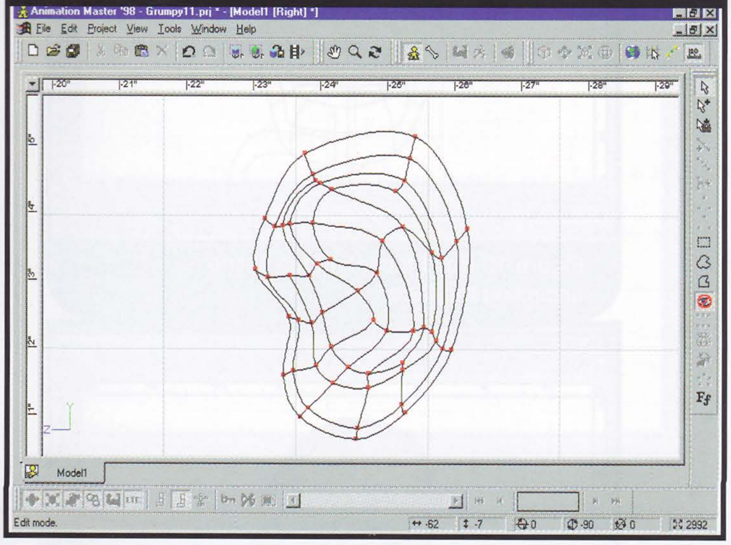
Finishing up the Details

Let's finish our mesh by building things like the nostrils, inner mouth and completing the eyes. We'll forego building teeth (or dentures) for this tutorial.

First, we'll create the nostrils by extruding them up into the head a couple times. The first extrusion should be fairly close to the opening and slightly larger than it, to create a sort of shelf inside. Go ahead and do this as you see in Figure 15.

Next we'll extrude the mouth opening back into the head to create the gums, inner mouth, and throat. Figure 16, though a bit confusing to look at, shows this. To get an idea of what you're looking at, imagine your head frozen and cut it in half down the center of the face — what would the inner mouth look like from the side? The lips would curl up into the head, then back down over the gums, then up again along the roof of the mouth, then back into the throat. This is basically what you are extruding.

Figure 12 Lay out the ear mesh.


Animation Master '98 - Grumpy11.prj * - [Model1 [Right] *]
File Edit Project View Tools Window Help
Model1
Edit mode.

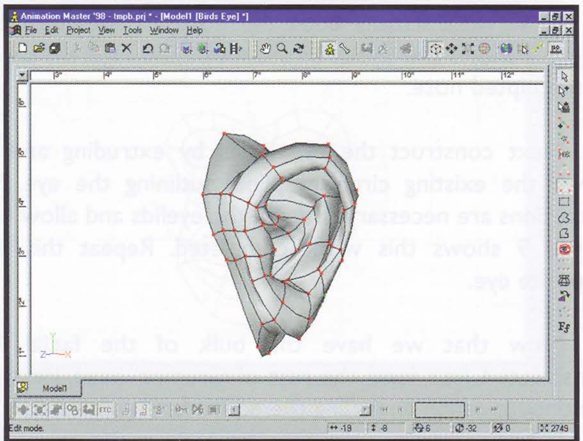

Animation Master '98 - tmpb.prj * - [Model1 [Birds Eye] *]
File Edit Project View Tools Window Help
Model1
Edit mode.

Figure 13 Sculpt the ear mesh and extrude the outer spline.

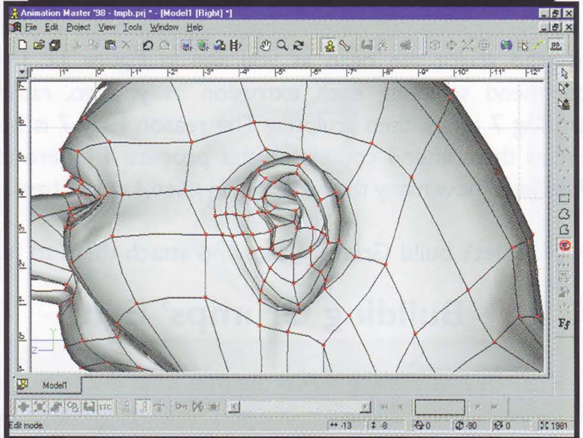

Animation Master '98 - tmpb.prj * - [Model1 [Right] *]
File Edit Project View Tools Window Help
Model1
Edit mode.

Figure 14 Connect the ear to the head.

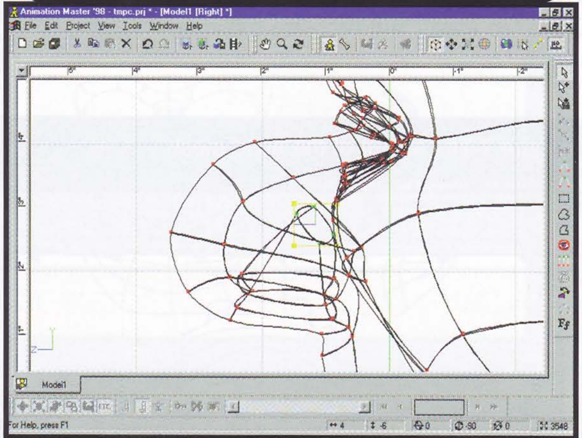

Animation Master '98 - tmpc.prj * - [Model1 [Right] *]
File Edit Project View Tools Window Help
Model1
For Help, press F1

Figure 15 Extrude the nostrils.

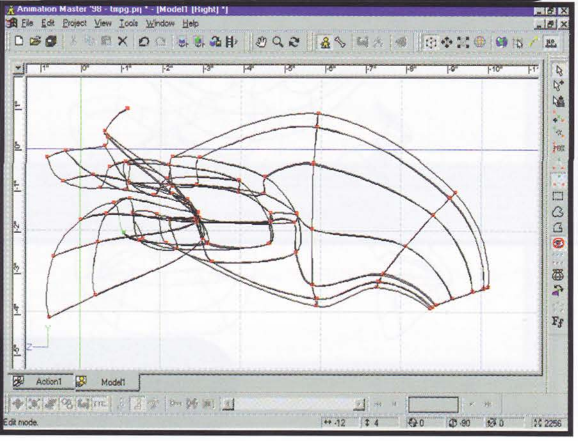

Animation Master '98 - tmpg.prj * - [Model1 [Right] *]
File Edit Project View Tools Window Help
Action1
Model1
Edit mode.

Figure 16 Extrude the mouth into the gums and throat.

We can then extend this process by extruding the tongue out of the back of the throat. (Using the circular spline created on the last extrusion made while creating the throat.) Take a look at Figure 17 to see what this looks like.

Now complete the eyes by extruding the existing hole back into the head a bit. This is the pink stuff you see if you look at someone's eyes from above or below. Figure 18 shows this. Let's make it a little more interesting and model the pink membrane in the corner of the eye. This can be done by simply creating a patch out of the spline at the back of the inner surface on the inside corner, and moving it forward a bit. To give it some curvature, you can make it a 5 point patch by adding a floating spline and adjusting it. You should then actually add the eyeball sphere and check that the eyelids don't penetrate it, and that you can see the corner membrane.

Let's give Grumps a few wispy eyebrow hairs. We'll model them out of simple lathed cones, then place 12 or so of them over each eye. We'll leave them straight for now, so when we take the snapshot of the face wireframe they will show up as black circles. These will allow us to paint deep sockets for them in the bump map. When we apply the textures, we'll make sure the hairs are hidden, then after Grumps is all surfaced, we'll bend each hair into shape. Figure 19 shows the hairs in place.

Now that we have Grumps head all modeled, we're ready to begin preparing it for surfacing.

Preparing the Model for Surfacing

So what are our options for surfacing Grumps? We could simply give him color and various specularity levels. We could texture him with the procedural included with AM. We could apply image maps (decals). But how do we apply image maps to such a complex organic character, you may ask? Read on, this is just what we'll do with Grumps.

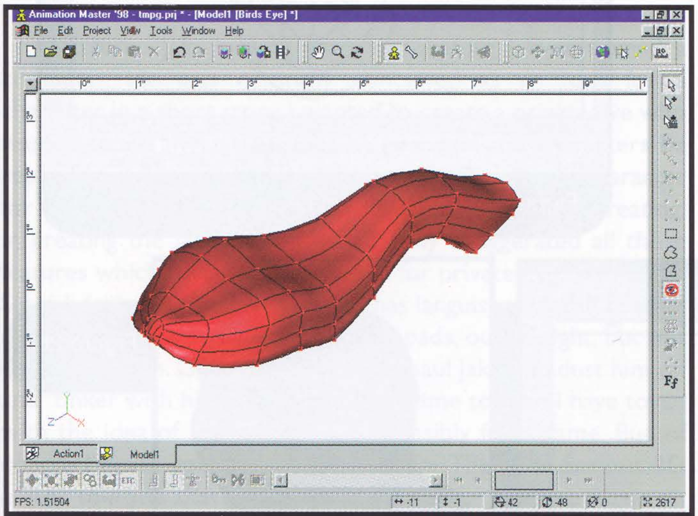

Animation Master '98 - tmpg.prj * - [Model1 [Birds Eye] *]
Action1
Model1
FPS: 1.51504

Figure 17 Extrude and sculpt the tongue from the back of the throat.

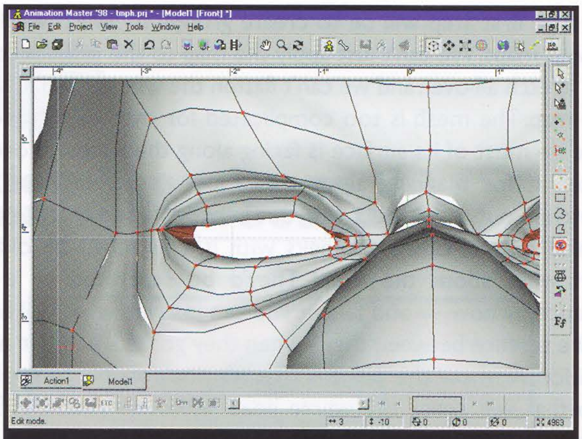

Animation Master '98 - tmph.prj * - [Model1 [Front] *]
Action1
Model1
Edit mode.

Figure 18 Complete the eyes.

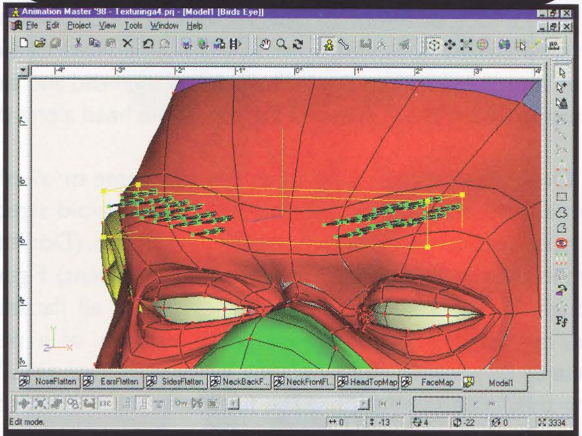

Animation Master '98 - Texturinga4.prj - [Model1 [Birds Eye]]
NoseFlatten
EarsFlatten
SidesFlatten
NeckBackF...
NeckFrontFl...
HeadTopMap
FaceMap
Model1
Edit mode.

Figure 19 Place the eyebrow hairs.

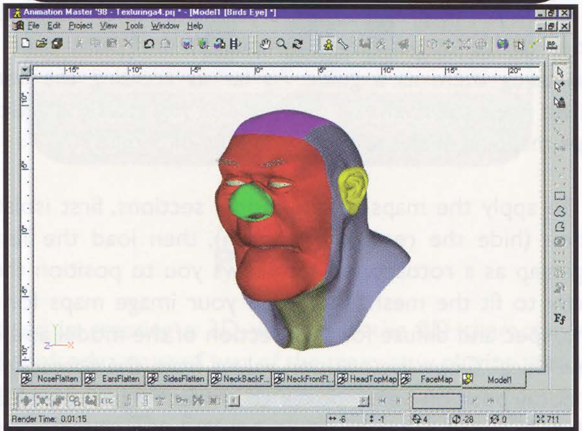

Animation Master '98 - Texturinga4.prj * - [Model1 [Birds Eye] *]
NoseFlatten
EarsFlatten
SidesFlatten
NeckBackF...
NeckFrontFl...
HeadTopMap
FaceMap
Model1
Render Time: 0:01:15

Figure 20 The model grouped into mapping sections.

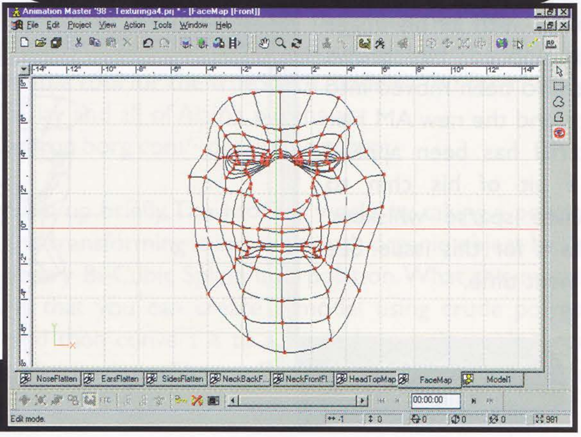

Animation Master '98 - Texturinga4.prj * - [FaceMap [Front]]
NoseFlatten
EarsFlatten
SidesFlatten
NeckBackF...
NeckFrontFl...
HeadTopMap
FaceMap
Model1
Edit mode

Figure 21 The face front template.

The first step will be to create groups to which we'll apply various maps. We can't just apply the map to the front because it will stretch all over, and we can't flatten the whole head and apply one map. The mesh is too complicated for that — consider the nose — most of its surface is facing along the x axis. In order to flatten it for mapping along the z axis, it would have to be stretched out along the x axis. But in order to do that, we'd have to also stretch out the cheeks with it. This might be okay, but then what about the eyes? They'd be separated by a great distance by now — and I'll bet you can imagine what will happen to the texture between them, when they go back to their normal position. Anyhow the point is that it's not possible to apply one map that will cover the whole head without stretching. So, we create groups that can be decaled along various axes.

Take a look at Figure 20. This shows the model split up into such sections. The nose, face, front of the neck and back of the head will be mapped along the z axis. The sides of the head and ears will be mapped along the x axis, and the top of the head along the y.

Once these groups have been created, some or all of them may need to be flattened a bit in isolation to avoid stretching. For each section you flatten, create a new action. (Don't flatten them in the model window or it will be permanent) Figures 21 through 25 show some of these. These were all flattened by hand, by dragging points so no patch or part of a patch is obscured by another, and by scaling it down to near zero. When doing this, keep in mind that the further a patch extends away from you, the further it needs to be stretched sideways.

Once you've prepared these, you take screen snapshots (or render to file to get larger templates), and paint your image maps using them as a guide. As far as creating the seamless texture maps themselves, I recommend you read the articles on image mapping in this and other issues of *Serious3D*.

To apply the maps to the model sections, first isolate the section (hide the rest of the mesh), then load the Template imagemap as a rotoscope. This allows you to position the map exactly to fit the mesh. Then load your image maps for color, bump, spec and diffuse for that section of the model and create a new decal. Copy the position values from the rotoscope into the decal position value boxes to perfectly size the decal. All that's left is to apply it.

Figure 26 Shows Grumps with all his image maps applied. His brows have also been moved into place, and the new AM hair material has been applied to a bit of his chin to simulate sparse whiskers. Thats it for this issue. See you next time.

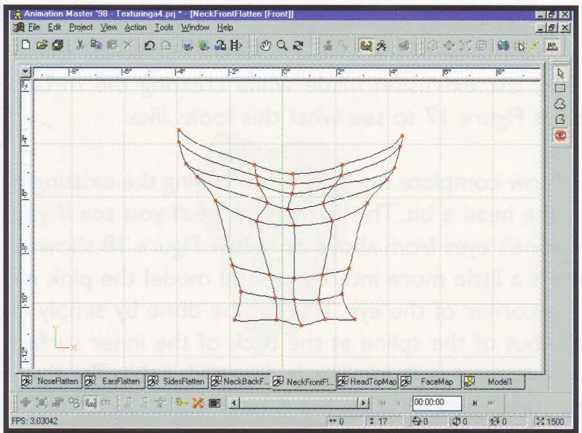

Animation Master '98 - Texturinga4.prj * - [NeckFrontFlatten [Front]]
File Edit Project View Action Tools Window Help
NoseFlatten
EarsFlatten
SidesFlatten
NeckBackF...
NeckFrontFl...
HeadTopMap
FaceMap
Model1
FPS: 3.03042

Figure 23 The neck-front template.

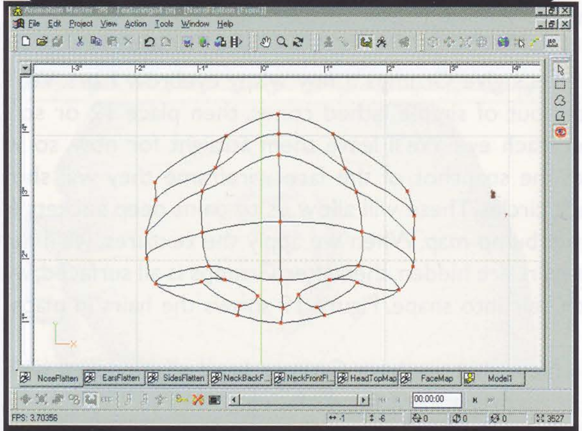

Animation Master '98 - Texturinga4.prj * - [NoseFlatten [Front]]
File Edit Project View Action Tools Window Help
NoseFlatten
EarsFlatten
SidesFlatten
NeckBackF...
NeckFrontFl...
HeadTopMap
FaceMap
Model1
FPS: 3.70356

Figure 24 The nose template.

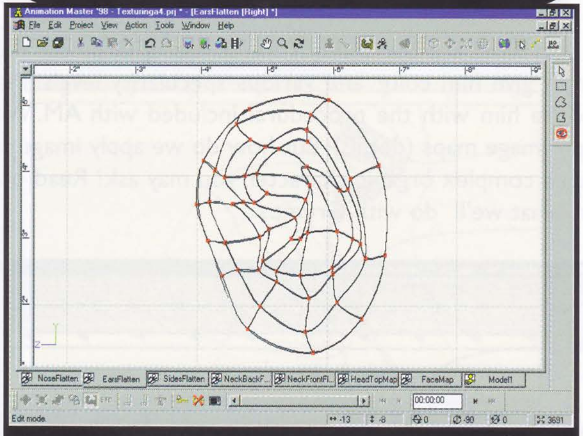

Animation Master '98 - Texturinga4.prj * - [EarsFlatten [Right] *]
File Edit Project View Action Tools Window Help
NoseFlatten
EarsFlatten
SidesFlatten
NeckBackF...
NeckFrontFl...
HeadTopMap
FaceMap
Model1
Edit mode.

Figure 25 The ear template.

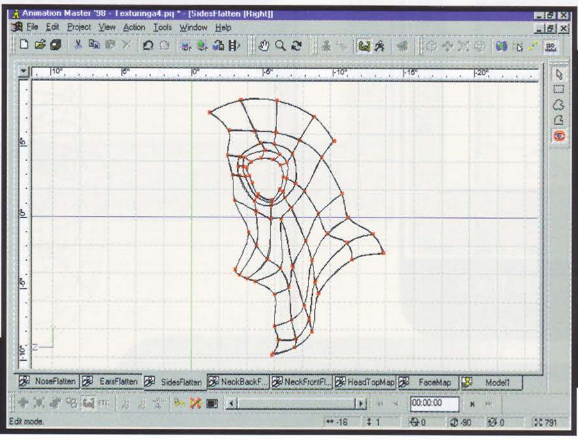

Animation Master '98 - Texturinga4.prj * - [SidesFlatten [Right]]
File Edit Project View Action Tools Window Help
NoseFlatten
EarsFlatten
SidesFlatten
NeckBackF...
NeckFrontFl...
HeadTopMap
FaceMap
Model1
Edit mode.

Figure 22 The side view template.

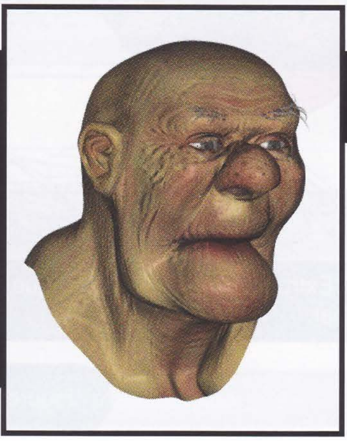


Figure 26.

trueSpace

Tough Talking Toon Turns 3D
Modeling a Living Toon with Truespace

By Darris Dobs

Jake Wise, P.I.. He's a hard-boiled, gimlet-eyed gumshoe of the old school. A hard-drinking, chain-smoking cynic with a hatchet face, steely eyes, a three-day beard and a nose that's been broke more than once. You won't find Jake sipping a decaf mochacino in some yuppie fern bar. No sir. And in case you wondered, the P.I. stands for politically incorrect. So don't expect to see him at a Save-the-Whales rally. He's quick with the wisecracks, and fast with his fists. He likes his coffee black, his bourbon straight, his women fast and the bad guys tough. The tougher the better.

Jake is a private eye, a gumshoe, a peeper if you will. Not the namby-pamby , oh-so-sensitive kind of P.I. you see on TV these days. You aren't going to see Jake wearing a Hawaiian shirt or meditating. Nope, Jake is a throwback to the good old days of Humphrey Bogart and James Cagney, Spencer Tracey and Edward G. Robinson. He always wears the same cheap suit and battered gray fedora. You might find him in a pool hall, a back alley or a sleazy waterfront dive, but he wouldn't be caught dead in a fitness club. He might be out to nab a lowdown blackmailer or a cold-blooded murderer or bust up a ring of international smugglers, but wherever he is, you can bet there will be trouble, and plenty of it. He 's a tough guy, through and through. A real man of action. A knight in tarnished armor, looking out through world-weary eyes that have seen it all. He knows just how bad things can get, but he keeps on trying anyway.

I created Jake several years ago, before I even owned a computer. He was originally conceived as an idea for a character in a short story. I wanted to create a private eye who was so tough and cynical that he parodied the characters he represented. He quickly evolved into a 2D cartoon character for a proposed comic strip that I never got around to creating. In creating the Jake toon, I deliberately exaggerated all those features which have become clichés for private eye characters. Since I designed him, however, he has languished at the bottom of a drawer, in a stack of old sketch pads, out of sight, but not quite forgotten. Occasionally I would haul Jake out, dust him off and tinker with him a little, and from time to time I have toyed with the idea of resurrecting him, possibly for a game. But, of course I never got around to using him. Then, the Serious 3D editor told me that this month's issue was going to focus on living toons. I immediately thought of Jake, excited about the prospect of bringing Jake into the third dimension using trueSpace3. And that is exactly what we are going to do in this month's column.

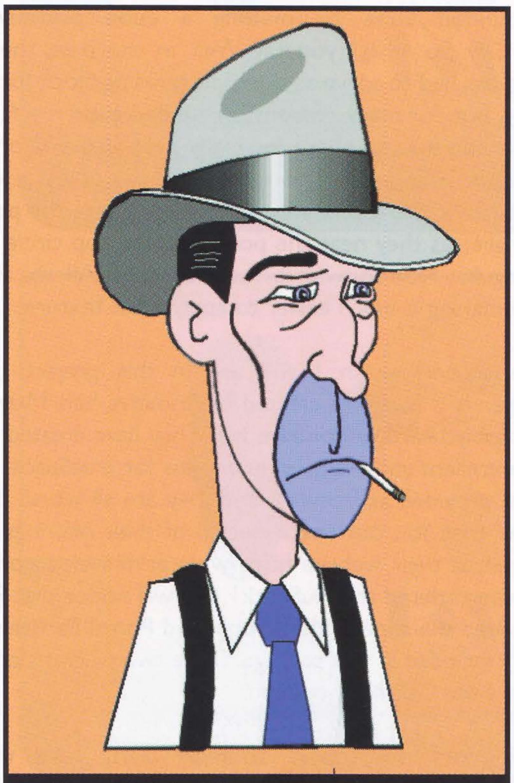


Figure 1 Jake Wise, a 2D character I created many years ago.

PlugIns

To aid in creating a 3D version of the 2D character, Jake Wise, I took advantage of two of the many new plugins that have been created by third party vendors since Caligari opened up their architecture. The first is a plugin called ThermoClay, a tool spearheaded by Bill Fleming and created by Alain Bellon. I was fortunate enough to be involved with the development of ThermoClay, and I'm happy to say that Alain not only met, but exceeded our expectations and has created what I think is an indispensable tool for the trueSpace modeler. You can check out ThermoClay and all of Alain's plugins at: http:gumdrop.borg.com/~dream/index.htm.

To sum up briefly, ThermoClay works by taking a polygonal object and transforming it into a smooth organic object by using a proprietary Bi-Cubic Spline Interpolation. What this means in English is that you can create a model using crude polygonal shapes and then convert it to a smooth organic mesh through the use of this plugin. ThermoClay can smooth objects with or without increasing their polygon count. It can also be used for skinning, by eliminating seams from Booleaned objects. It even works on open objects. The possible applications for this plugin are endless, but I will point out two in particular. First, as I mentioned earlier, when two polygonal objects are joined by using Boolean Union, too often a very noticeable seam is created, where you would prefer a smooth unbroken surface. With ThermoClay you can now melt the object, smoothing the joint. The second application I will describe is so simple you may not fully appreciate it's value at first. You can now easily create a true rounded cube by melting a cube primitive with ThermoClay. So what? you say. Well, in the past, the sphere primitive has had to serve as the basic building block for organic modeling. But, for many reasons, a rounded cube is a far better building block than a sphere for many purposes. For one thing, it makes mapping detailed textures onto the object accurately, much easier. At the top and bottom of a sphere the poly faces grow smaller as they near the poles, and the top circle of faces are triangular. Not so, with a rounded cube. All six sides are identical making it much easier to apply a flat texture.

The second plugin I will use in this project is called Unwrapper. It is freeware created by Primitive Itch. Many of you have probably heard of Primitive Itch. They have created a whole slew of excellent and really useful plugins for trueSpace. Many of these are provided as freeware and they are all worth far more than they cost. You can check out all of their offerings and get Unwrapper at their website http://www.primitiveitch.com. Those of you who ordered the PluSpack1 CD will notice that Primitive Itch provided the superb Mesh Forge and Primal Particles plugins that were included in that package. These two plugins alone justify the cost of the CD in my opinion.

I was fortunate enough to meet Scott Miles, the head honcho at Primitive Itch, when I attended the Computer Game Developer's Conference at Long Beach in May. Scott and I were featured speakers at Caligari's sponsored session on Low-Cost 3D For Independent Game Developers, along with Roman Ormandy, the president and founder of Caligari Corp. After listening to Scott speak and visiting with him afterward, it is easy to see why those guys at Primitive Itch are turning out such great stuff. Scott is a great guy and one heck of a plugin developer. It is the work of people like Alain Bellon and Scott Miles who are extending the abilities of tS3 as far as you can imagine, and the versatility their plugins provide are edging trueSpace ever closer to being a complete solution for 3D animation. Oh, and by the way, the big news at the conference is that Caligari has made a deal to license the LightWorks render engine. That really is big news, because it means that trueSpace will soon have the ability to render incredibly high quality images. I'm excited.

Shaping the Shamus

In this tutorial, we are only going to create the head of our living toon gumshoe, and concentrate on creating a face which expresses the personality of Jake Wise and, hopefully, conveys his character.

Modeling the Head

We are going to model the head in an entirely logical sequence. This is completely out of character for me, but I thought I would try something new. We will begin by creating the basic head object. We will then proceed to add such essential accessories as a nose, eyes, ears, etc. Next, we will place his trademark gray hat on his head at just the right angle, and finally we will apply the surfaces, texture and bump maps.

A Base for the Face

We will begin this project in Front View. Right click on the Add Sphere Primitive icon to open the Sphere Properties panel. Enter a value of 20 for Latitude and 30 for Longitude, and then click on the Add Sphere Primitive icon. Now, select the Deform Object tool. In the Deformation Navigation panel, select Deform Perpendicular to the Z axis and create a deformation lattice that divides the sphere into eight sections along the Z axis. Select Stretch from the Deformation Navigation panel and scale the control panels as shown in Figure02 to create the basic shape of the face as seen from the front.

We will switch to Side View now. Continue scaling the control planes to shape the head. See Figure03. When you have finished, create another sphere primitive, scale it to the size shown in Figure 3 and move it into position. This is going to be our character's nose.

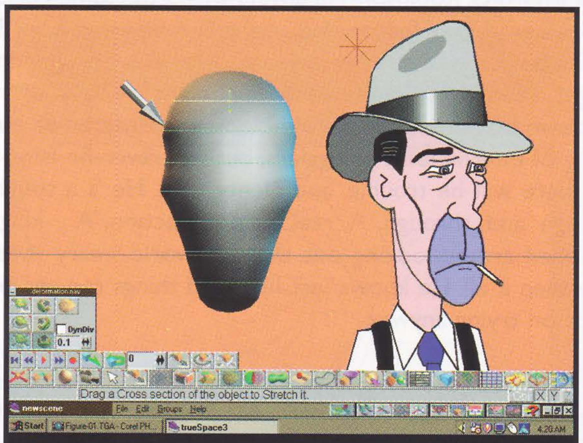

Drag a Cross section of the object to Stretch it.

Figure 2 Use Deform Object to shape the sphere primitive.

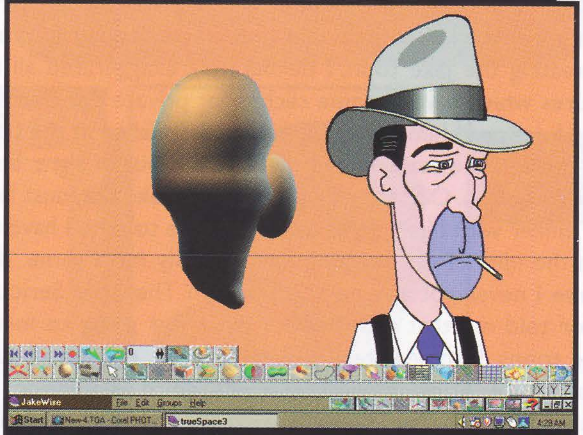


Figure 3 Create a second sphere to serve as a nose.

Creating the Nose

Using the same process we used to shape the basic head object, use Deform Object to apply a deformation lattice to the nose and manipulate the control planes along the Z axis to create the shape of the nose. See Figure 4.

Switch to Front View and continue deforming the nose to match the shape shown in Figure 5.

ThermoClay

To complete the nose, we will use ThermoClay for the first time. Create a Cube primitive and quad divide it once. Now open the ThermoClay plugin. The plugin interface is quite simple. See Figure 6. Along the top are three sliders. The first slider; Passes, represents the number of smoothing passes the program will make over the object The middle slider, Tension, represents how strongly the new mesh will be constrained to the original polygonal object. The third slider, Cycles, represents the number of times the entire operation will be applied to the object.

Beneath the slider are three buttons. Each represents a function that is either on or off. The top button determines whether the object will be subdivided before smoothing is applied. The second button determines whether smoothing will be applied or not. The third setting is called nuclear melt and is fairly self explanatory. It determines if extreme smoothing is to be applied. In most instances it is recommended that you accept the default settings.

With Passes set at 1, Tension set at 0% and Cycles set at 1, and all three buttons activated, make certain that the cube is selected and then click on the large button marked Melt. This will create a rounded cube. You will have to delete the original cube manually, as it is not destroyed in the process. This is a safeguard in case you decide you do not like the result of the melt.

In Front View again, scale and position the new rounded cube as shown in Figure 7. This object is going to represent the Ala of the nose. The ala is the flare of the nose over the nostril. Once the rounded cube is properly sized and in position, you can shape it with the Deform Object tool. To create the nostrils, simply Boolean Subtract two cylinders.

Once the ala is appropriately shaped and the nostrils have been added, we will join it to the rest of the nose through Boolean Union. Our nose is now complete. It should resemble the illustration in Figure 8.

Once the nose is complete, we will join it to the main head object. To do this, switch to Side View and carefully position the nose. Join the two objects using Boolean Union. See Figure09. We now have the basic shape for Jake's head and face, but if you render the object, you will see that there is a very clear seam between the nose and the face. This will leave an obvious line between them when you go to render the object. Therefore, we will turn once again to ThermoClay and melt Jake's head. Once

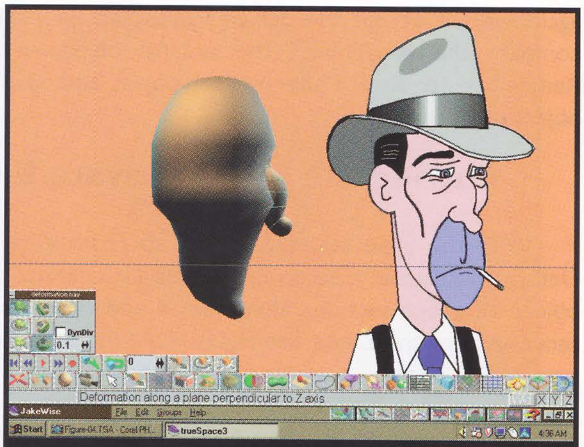

Deformation along a plane perpendicular to Z axis

Figure 4 Use Deform Object to shape the nose.

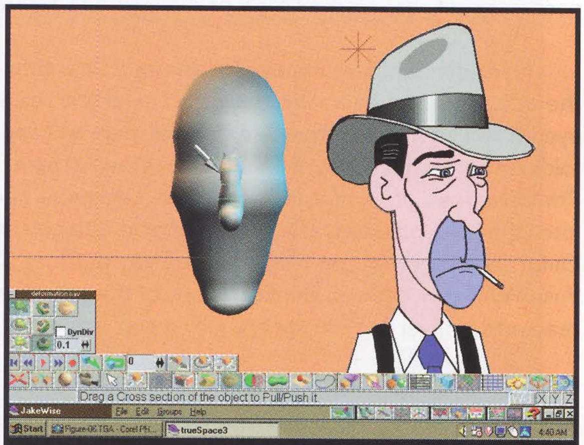
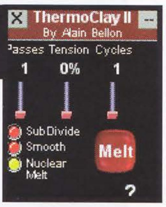

Drag a Cross section of the object to Pull/Push it

Figure 5 Continue deforming the nose in Front View.

Figure 6 The ThermoClay Interface.


Passes Tension Cycles
1 0% 1

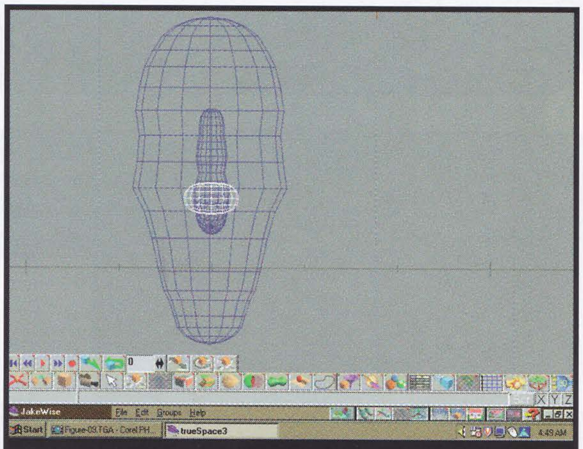


Figure 7 Move the rounded cube into position.

again, we will accept the default values and hit Melt. You can compare the result with the original object in Figure 9. Remember to discard the original object and save the new object as Jakehed.cob.

Putting the Eye in Private Eye

With the head selected, switch to Front View. Click on Deform Object and create a deformation lattice that divides the object into four sections along the X and Y axes and eleven sections along the Z axis. See Figure10. At the points where the eyes will be, click on a vertex intersection.

Next we will switch to Side View and move the selected vertex along the X axis toward the rear of the head. We are creating the cavities into which the eyes will fit. You can also use the deformation lattice at this point to make any further necessary changes to the shape of the face. See Figure11.

Now that we have cavities for the eyes, it is time to create the actual eye sockets. These are just pockets, really, that the eyeball will sit in. Once they are in place, they will appear as the folds around the eyes. Still in Side View, create a Sphere Primitive, scale it, rotate it 90 degrees clockwise and move it into the eye position. Click on Deform Object and in the Deformation Navigation panel select Deform Along Z Axis and Push/Pull. Now, click on the very front of the sphere and drag it rearward, converting the sphere into a cup shape. See Figure12.

Our next step is to return to Front View and continue to deform the object, this time along the X axis. We are aiming for the hard-eyed squint of our 2D character. See Figure13. The eyeball is just another sphere that is scaled and positioned as shown in Figure 13.

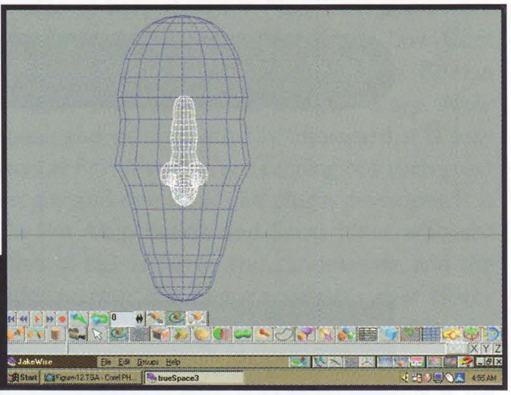


Figure 8 The completed nose.

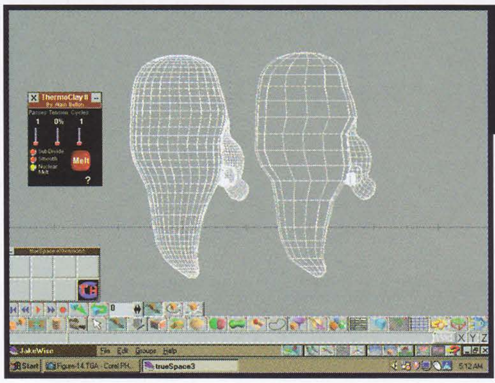


Figure 9 Jake's head after and before ThermoClay.

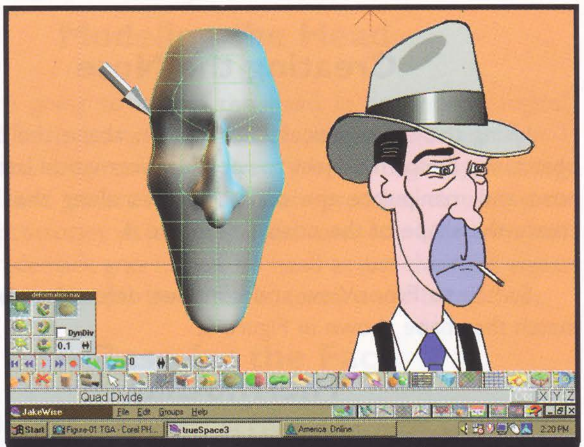


Figure 10 Select the vertices over the eyes.

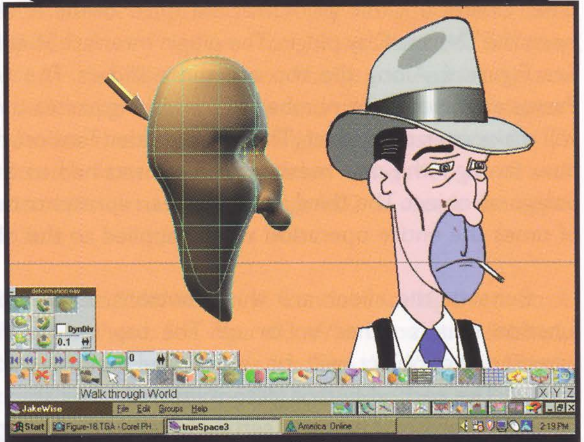


Figure 11 Use Deform Object to create cavities for the eyes.

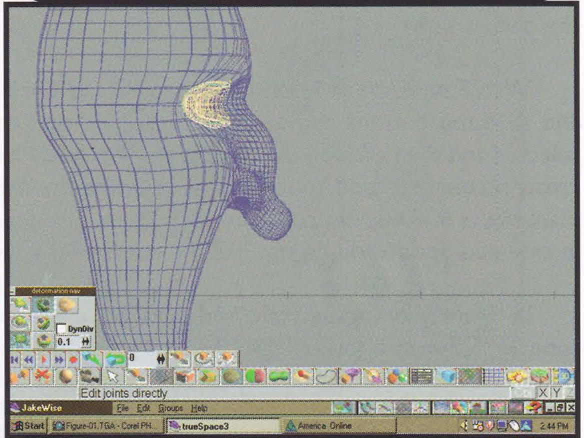
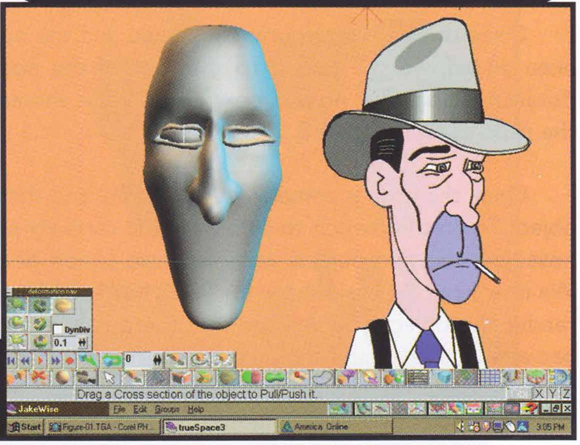


Figure 12 Use Deform Object to create a cup shape facing outward.



Drag a Cross section of the object to Pull/Push it.

Figure 13 The squinting stare of a hard-boiled hero.

Ear We Go

We've got a head. We've got a misshapen nose. We've got squinty eyes. Now we need a pair of cauliflower ears. A humanoid ear is actually one of the more difficult objects to model. This is due to the odd architecture of the ear, which is actually composed of a series of concave, opposing swirls. Even though Jake is a toon, we want to stay fairly close to a realistic shaped ear, in order to maintain the illusion of life. Once again, we start by creating a Sphere Primitive. Next we will turn once more to our trusty Deform Object tool. In Side View manipulate the control planes along the Z axis to create the object shown in Figure14.

If we switch to the Top View and elongate the current object, we will have a good base from which to construct the rest of the ear. It should appear similar to Figure15.

Let us remain in Top View for now. Copy the current object, scale the duplicate as shown in Figure16 and move it into the upper left corner of the main ear object.

Select the original ear object again, make another copy, and scale and position this duplicate to match Figure17.

Now, we will switch back to Front View. Select Deform Object and deform the new object along the Z axis as shown in Figure18.

At this point we will switch to Side View and continue deforming the current object as shown in Figure19.

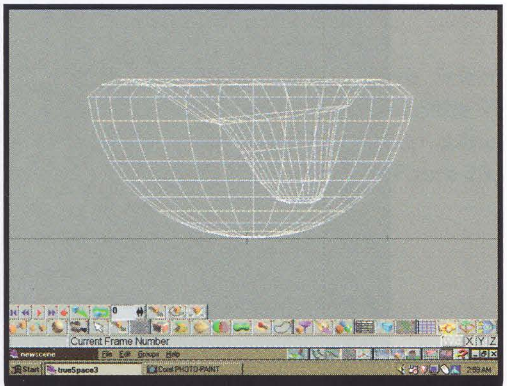

Current Frame Number

Figure 14 The first step in creating the ear.

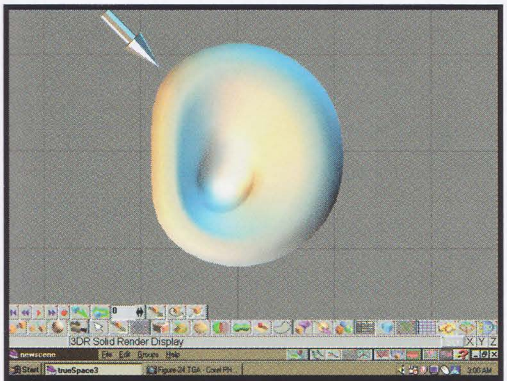

3DR Solid Render Display

Figure 15 Elongate the current object in Top View.

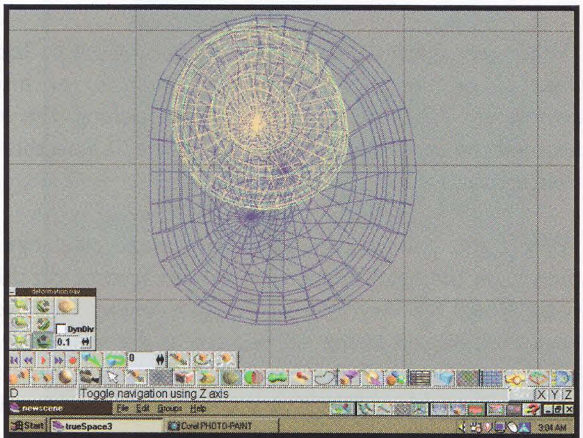

Toggle navigation using Z axis

Figure 16 Copy the ear object and move and scale the duplicate as shown.

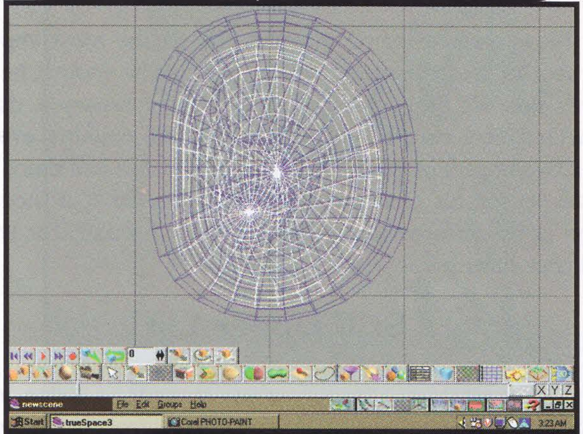


Figure 17 Create a second smaller duplicate of the ear.

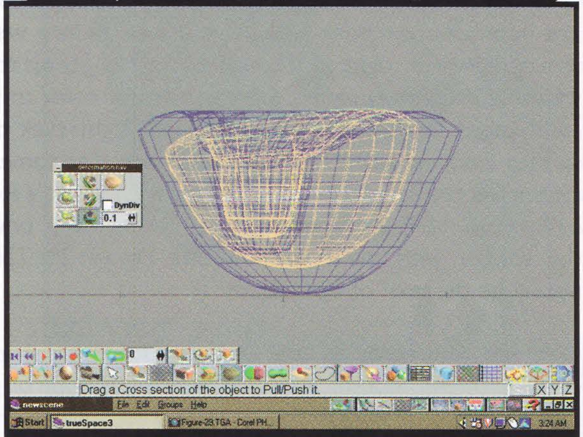

Drag a Cross section of the object to Pull/Push it.

Figure 18 Deform the new object along the Z axis.

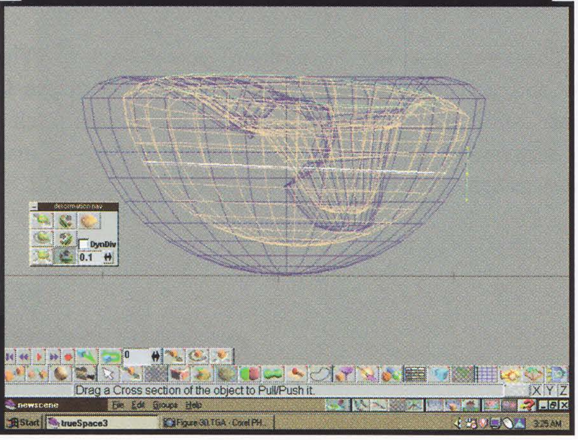

Drag a Cross section of the object to Pull/Push it.

Figure 19 Continue deforming the object in Side View.

When you finish deforming the object, switch to Top View. Boolean Union the three components of the ear into one object. Open ThermoClay again, and accepting the default values, melt the ear. It should resemble Figure20. Save this object as Jakeear.cob.

When the ear is completed, our next challenge is to position it on the head. The easiest way to accomplish this is to open additional Top View and Side View windows. Now, you can observe the position of the ear relative to the head from three angles simultaneously. See Figure 21. Once the ears are in position, they can be attached to the head using Boolean Union.

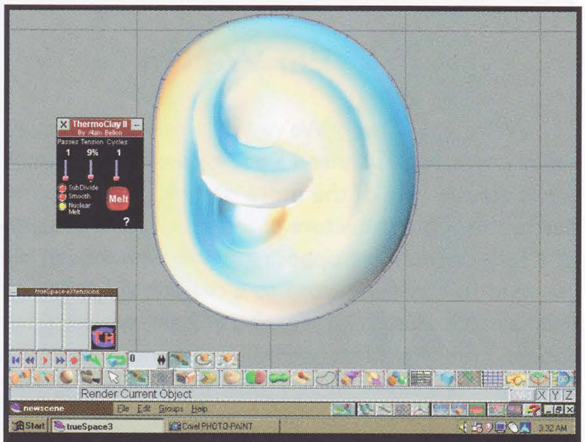


Figure 20 Boolean Union the components of the ear and then melt it with ThermoClay.

Building the Mouth

Now we have come to what may be the most important element of Jake's face; the mouth. Without his mouth, he could never fire off the wisecracks and snappy repartee that are expected of a hard-boiled private eye. He couldn't even slug back two fingers of gin in some waterfront dive and there would be no lip for his cigarette to dangle from. So, it is incumbent upon us to capture the proper set to our hero's razor thin lips and rock hard jaw.

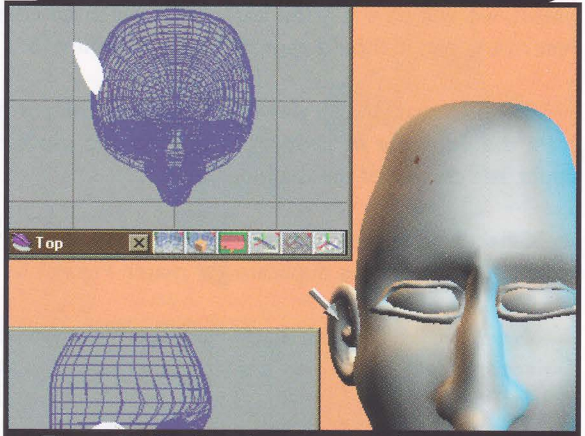


Figure 21 Position the ear using three windows simultaneously.

Stiff Upper Lip

Let us start with the upper lip. Surprise, surprise, we are going to begin by creating a Sphere Primitive. Next, yep, you guessed it, we are going to begin shaping the sphere using Deform Object. So, create a deformation lattice that divides the sphere into seven sections along the Z axis. Before we start deforming, however, right click on any of the Paint tools to open the Material Properties panels. Set the material color to a dark red, and select Smooth and Phong-shaded. Right click on the bump map icon and select the orange texture that comes with trueSpace. Set the Amplitude to .5 and set both U and V Repeats to 2. Now use the Paint Faces tool to paint the lower one third of the sphere with the red color. See Figure 22. This will eventually be the roof of our mouth.

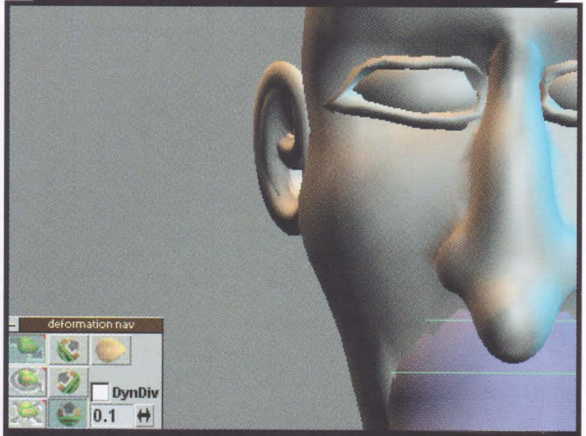


Figure 22 Use Deform Object to Shape the Upper Lip

We are now ready to use Deform Object to shape the upper part of the mouth. Scale and move the control planes along the Z axis as shown in Figure 22. The object is to create a wider ridge in the middle of the sphere. This will be the actual upper lip.

The next step will be easier if you switch to Wireframe View. You also need to switch to Side View. With the Deform Object still active and constrained to the Z axis, click on the very bottom of the selected sphere and pull it up inside the sphere to create the roof of the mouth. See Figure 23.

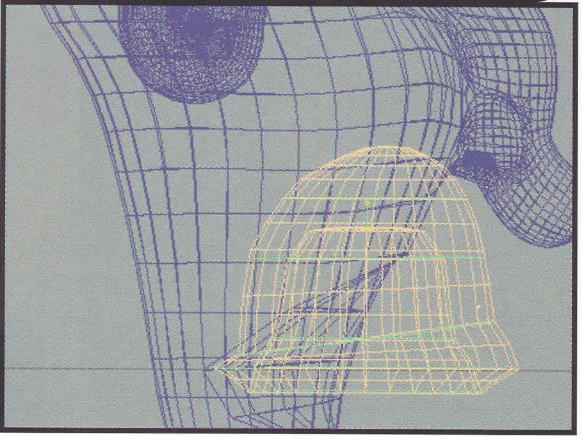


Figure 23 Pull the bottom of the sphere up to create the roof of the mouth.

The next step in this object is to create a cube primitive and position it diagonally so that it covers the back half of the upper lip object at an angle. We are going to Boolean Subtract the cube from the upper lip object so that only the front half of the object remains. See Figure 24.

We will now return to Front View. Activate the Deform Object tool again and create a deformation lattice like the one in Figure25. Use the lattice to continue shaping the upper lip and to create the groove that runs from the nose to the middle of the upper lip. This groove is called the philtrum.

Lower Lip

To create the lower lip, we will begin by making a copy of the upper lip and rotating it 180 degrees. You will see the result of this in Figure 26.

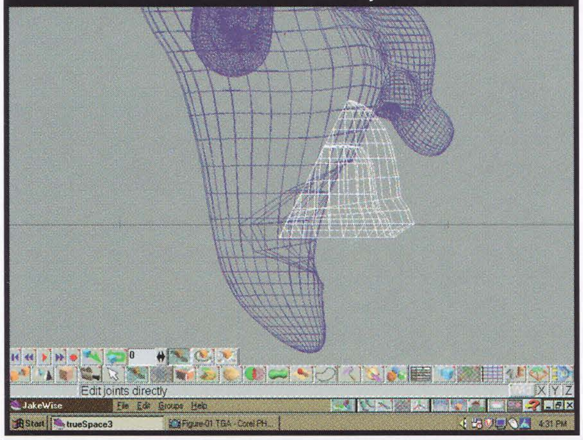
All we have to do now is to use Deform Object to shape the lower lip so that it meets the upper lip evenly. We also need to shape the chin. See Figure 27.

The Teeth and Gums

Now it is time to give our copper some choppers. How else is he going to take a bite out of crime? Once again, it is up to you how detailed and realistic you wish to make your character. I like to add a lot of details and make the character as lifelike as possible. On the other hand, we shouldn't forget that this is a toon. It is easy to get so bogged down in the details that the character loses it's flavor.

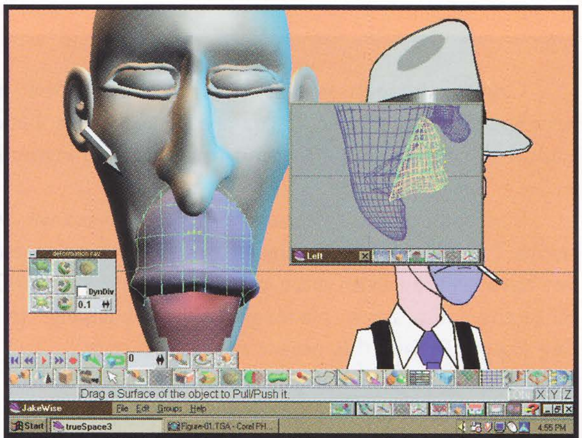
We will create the gums first. Begin with a sphere. Select Deform Object and manipulate the control planes along the Z axis as shown in Figure 28. We want to create a cup shape basically. Each of these cups will contain one tooth. See Figure 28.

Figure 24 Boolean Subtract a cube to remove the back half of the object.



Edit joints directly

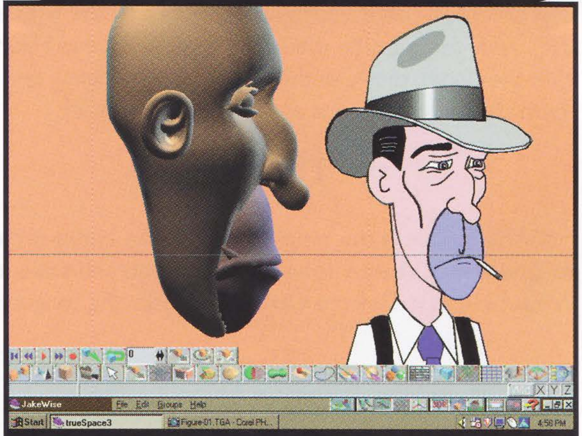
JakeWise
File Edit Groups Help
Start
trueSpace3
4:31 PM



Drag a Surface of the object to Pull/Push it.

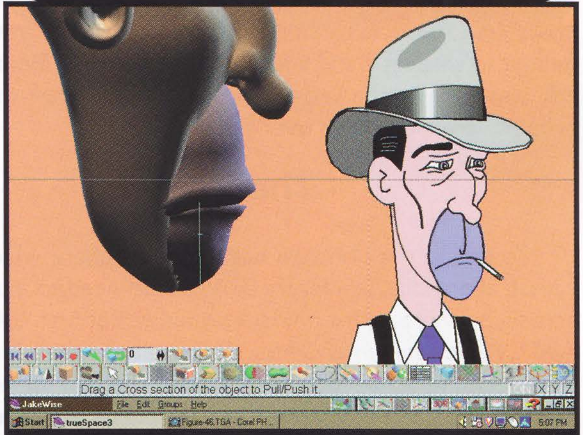
Left
DynDiv
0.1
JakeWise
File Edit Groups Help
Start
trueSpace3
4:55 PM

Figure 25 Use Deform Object to finish shaping the upper lip.



JakeWise
File Edit Groups Help
Start
trueSpace3
4:56 PM

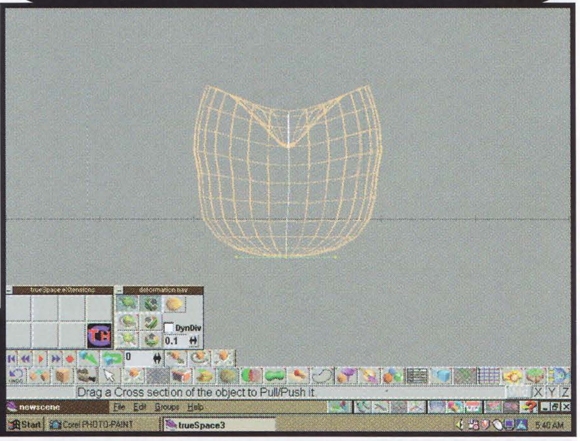
Figure 26 Copy the upper lip and rotate it 180 degrees.



Drag a Cross section of the object to Pull/Push it.

JakeWise
File Edit Groups Help
Start
trueSpace3
5:07 PM

Figure 27 Use Deform Object to shape the lower lip and chin.



Drag a Cross section of the object to Pull/Push it.

DynDiv
0.1
newscene
File Edit Groups Help
Start
Corel PHOTO-PAINT
trueSpace3
5:40 AM

Figure 28 Deform a sphere into a cup shape.

Create thirteen copies of the cup shaped object and arrange them in a U shape to create the gums. Now Boolean Union all of these copies into one object. See Figure29.

Into each of the cavities in our gum object we will nestle a tooth. The teeth are nothing more than rounded cubes which we have created from cube primitives using ThermoClay. When all of the teeth are in place, glue them as siblings to the gums. See Figure30. Save this object as upteeth.cob.

Switch to Side View and position the upper teeth object we just created inside the upper lip as shown in Figure31. Now, create a copy of the upper teeth object, rotate the duplicate 180 degrees and scale it approximately 20 percent smaller. Position the lower teeth inside the lower lip as shown in Figure31. Now, glue the upper teeth to the upper lip as a sibling and the lower teeth to the lower lip as a sibling. See Figure 31.

The Tongue

The tongue is the simplest part of the entire project. Switch to Side View. Create a sphere and position and scale it as shown in Figure32. Use Deform Object to create the tongue shape.

The Hat

No hard-boiled private eye worth his salt, would be caught dead without his hat. Jake is no exception. His battered gray fedora is his trademark. Creating the hat is something of a challenge. I kept it fairly simple for this project, but you could go further, in shaping it and adding character. As any Bogart fan can tell you though, the most essential thing is that the brim is properly snapped down over the eyes.

The Brim

To create the brim, we begin with a sphere which we will squash almost flat. See Figure 33. We then need to intersect the squashed sphere with a cylinder primitive. But first, right click on Add Cylinder and enter 34 for the Longitude value. Now, create a cylinder and scale it so that it is taller than the sphere as seen in Front View, but overlapped by the sphere evenly, all the way around, as viewed from the top.

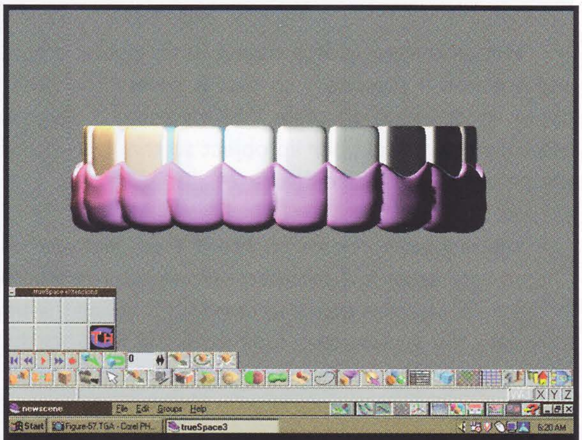


Figure 30 Use rounded cubes as teeth.

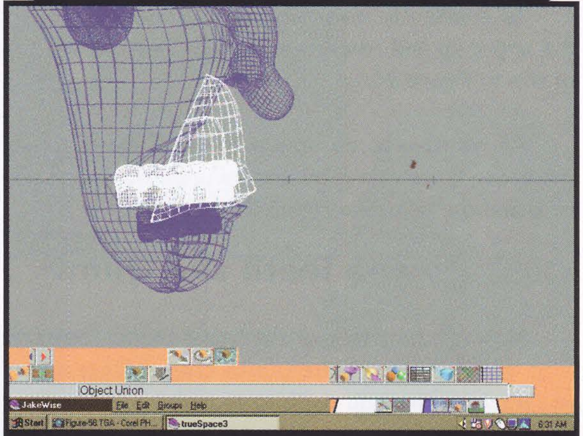


Figure 31 Position the teeth inside the mouth.

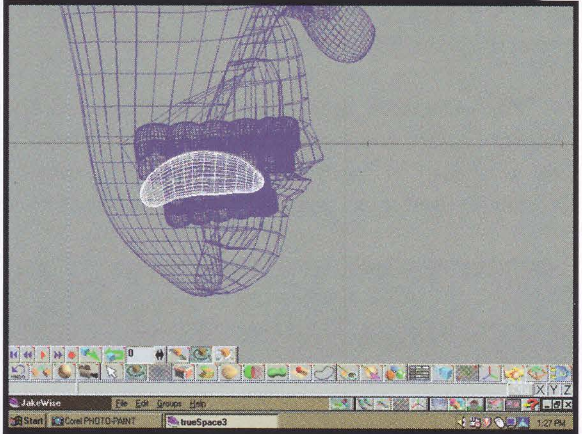


Figure 32 Create a tongue using a sphere and Deform Object.

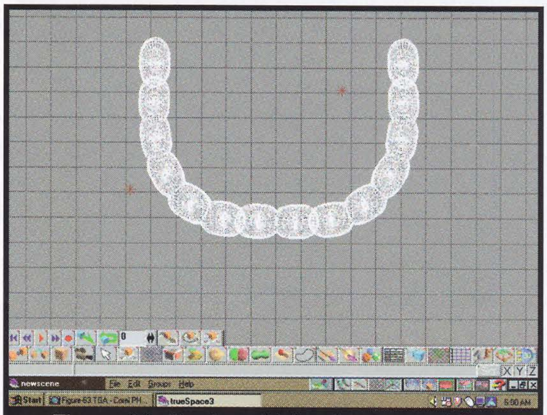


Figure 29 Boolean Union fourteen of the cup-shaped objects into a half circle.

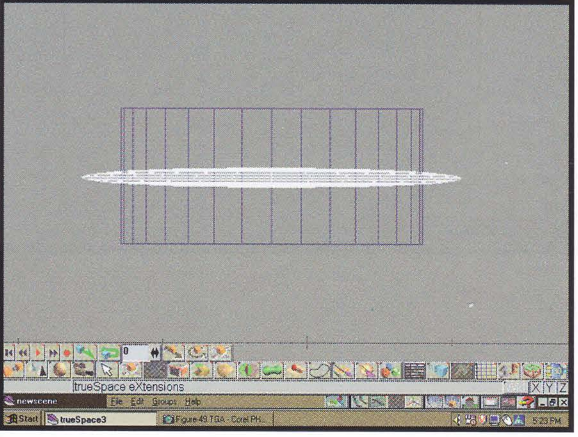


Figure 33 Create a cylinder inside the squashed sphere.

In Top View, intersect the cylinder with the squashed sphere. The object that remains will become the brim of our hat. Since the inside of the hat will not be viewed, we will not bother creating a hole for the head. See Figure34.

Activate the Deform Object tool and create a deformation lattice that divides the brim object into four sections along both the X and the Y axes. See Figure 34. Now switch to Side View and in the Deformation Navigation panel, select Deform Perpendicular to the Y axis. Now move and rotate the control planes so that the back of the brim is snapped up and the front of the brim is snapped down. See Figure35.

The Crown

The crown of the hat begins as a Sphere Primitive. The basic shape is achieved using Deform Object, by manipulating the control planes along the Z axis. The deformation lattice should divide the object into seven sections vertically. The bottom two control planes of the sphere are pulled up to leave the bottom of the crown flat. The top of the sphere is pulled down even with the third control plane. The second control plane from the top is then pulled down slightly below the third control plane. This leaves a rim around the top of the hat. The third control plane should then be rotated slightly counterclockwise to tip the front of the crown up and the rear of the crown down. The top of the sphere and second control plane should be rotated to the same angle. Refer to Figure36.

We want to switch back to Top View now and begin deforming along the Y axis to achieve the classic pinched front shape of a fedora. See Figure37.

We have to return now to the Side View and finish shaping the hat using local deformation by clicking and dragging vertices to create the dents in the top of the crown. See Figure38. When this is completed, join the crown to the brim using Boolean Union. Save this object at Jakehat.cob.

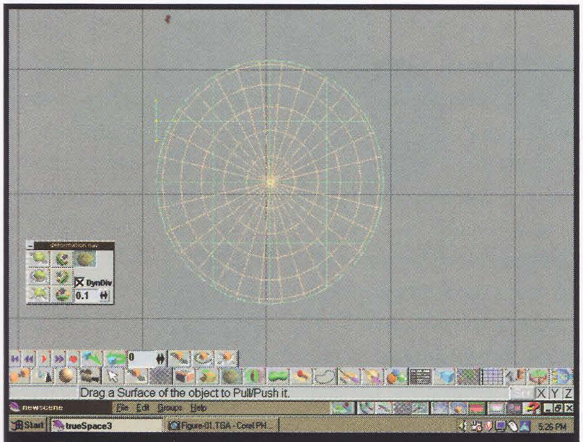

Drag a Surface of the object to Pull/Push it.

Figure 34 Intersect the cylinder with a squashed sphere.

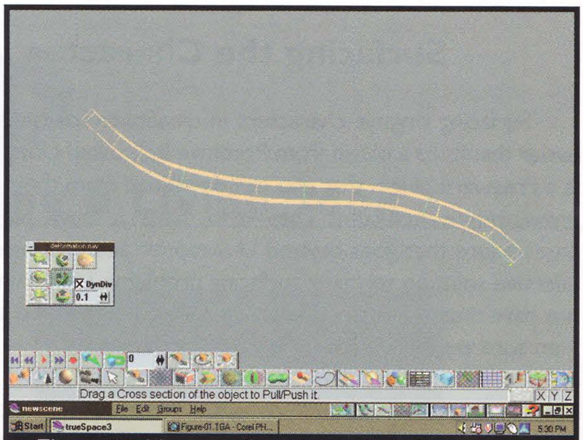

Drag a Cross section of the object to Pull/Push it.

Figure 35 Move and rotate control planes to shape the brim.

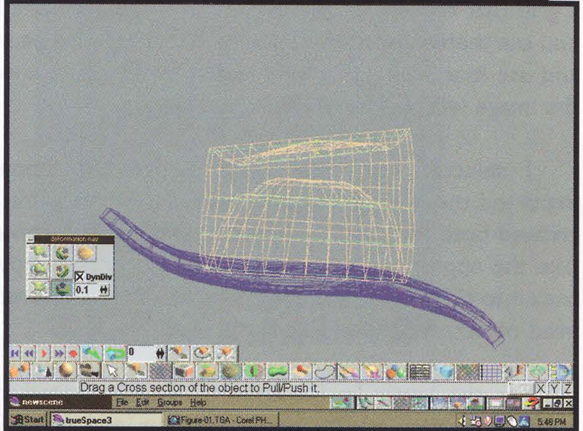

Drag a Cross section of the object to Pull/Push it.

Figure 36 Deform along the Z axis to create the basic shape of the crown.

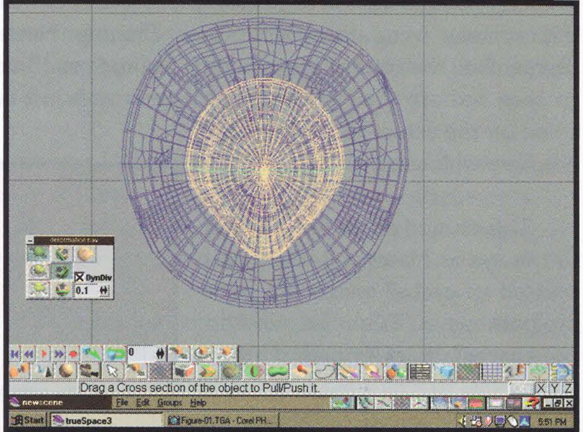

Drag a Cross section of the object to Pull/Push it.

Figure 37 Deform along the Y axis to achieve the pinched front shape.

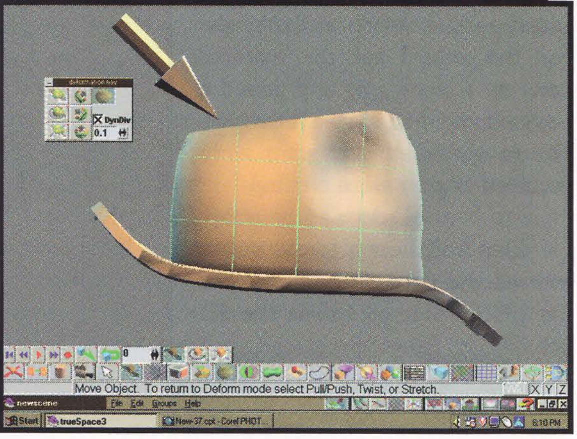

Move Object. To return to Deform mode select Pull/Push, Twist, or Stretch.

Figure 38 Use local deformation to put the dents in the crown.

Surfacing the Character

Surfacing organic characters in trueSpace has been made far easier thanks to a plugin from Primitive Itch called Unwrapper. This is a Freeware plugin that you can download from their website at www.primitiveitch.com. They also have a new plugin called trueTexture that goes beyond Unwrapper and promises to be an effective solution to many surfacing problems. Unfortunately, I did not have time to review this plugin before finishing the article. But, I am sure we will be covering it in later issues.

Unwrapper is a simple program. You simply select an object in trueSpace and open Unwrapper. Click on Unwrap Selected Object and you will see a graphic representation in the form of a grid that represents the surface of the object. See Figure 39. You can then export this as a bitmap, take it into a paint program and use it as a template for creating image maps, knowing how the image will be mapped onto the object.

I selected the basic head object, Unwrapped it and exported the map into a paint program. In the paint program I created both an image map and a bump map. I wanted to give Jake the appearance of being weathered. I then brought these back into tS3 and applied them. The hair I hand painted onto the head object using the Paint Faces tool.

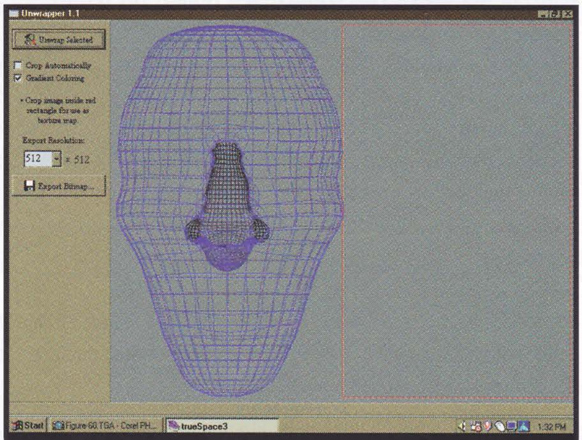
For the lower lip I created a Granite Procedural texture using three very similar shades of blue and one of black to simulate an unshaven face. I then added a noise bump at a very low amplitude to complete the illusion of whiskers. I then applied this surface using the Paint Over Existing Materials tool. (Remember, the roof of the mouth is painted red.) I then had to go back and use the Paint Faces tool again with just a plain blue color on the actual lip so that I did not have whiskers on this area.

The iris and pupils were added to the eye as Material Rectangles. I created an eyeball image in a paint program as a TGA file with a transparent background. I then placed the eyeball image on each eyeball as a material rectangle. The hat was surfaced with a uniform gray color. To create the hatband, I added another Material Rectangle. For this one, I set the material color as a shiny gray and added a textile bump map to give it texture. The tongue, teeth and gums were textured as they were created.

That is all there is. Jake Wise has entered the third dimension, if not the 1990's. All in all, I think the 3D version pretty accurately captures the flavor of the original 2D character. The beauty of 3D is that you can add even more expression and humanity to the character, making it easier for the viewer to suspend disbelief. And after all, that is what it is all about — getting people to forget for a little while that our characters are only make believe. See Figure 40.

The Finished Project

And that is how I went about converting my 2D character, Jake Wise, into a full fledged 3D living toon. I was very happy with the final result of this project. Who knows? I may end up creating a project around the Jake Wise character after all one day. The character can be fully animated by using Deform Object to create animated deformation. The same principles we used to convert Jake can be applied to any 2D toon. So, dig through those desk drawers and try to find that great character you doodled when you were supposed to be studying chemistry and see what you can do.



☐ Crop Automatically
☑ Gradient Coloring

• Crop image inside red rectangle for use as texture map

Export Resolution: 512 x 512

Figure 39 The Unwrapper interface.

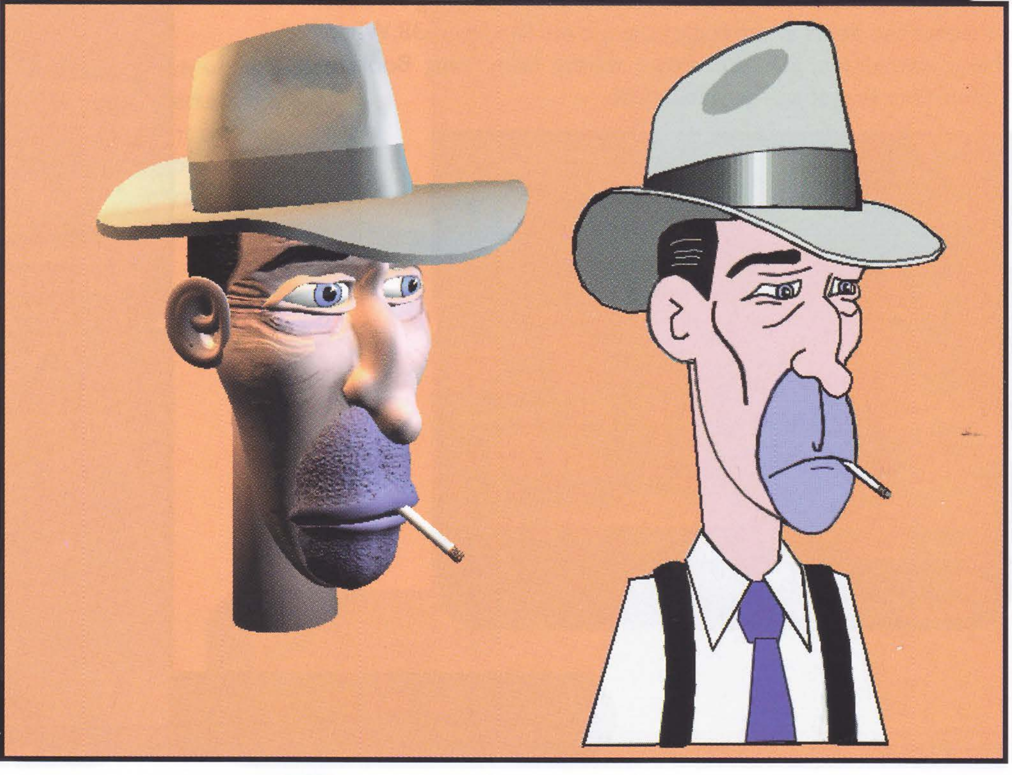


Figure 40 The completed 3D version of Jake Wise P.I.

Photoshop

Surfacing a Living Toon

By Bill Fleming

Bringing cartoon characters to life! That's what we'll be doing in this tutorial. We're going to bring Dr. Dread to life with image maps we create in Photoshop.

Dr. Dread is a Level One Living Toon. He leans heavily towards human, so his features tend to be more neutral, though he does have large eyes and a huge head. To make Dread a Level One Living Toon, we'll need to give him realistic, human surfacing. This has long been one of the most challenging aspects of creating photorealistic human models. Fortunately, in this tutorial, we'll meet the challenge.

Before we start the actual process of creating the image maps, let's take a quick overview of photorealistic human surfacing. The most important element of human surfacing is Diffusion. I can't stress how important this attribute is when creating human skin, or any other skin for that matter. To make skin appear soft and porous, we need to diffuse the surface. Diffusion scatters the light, which makes the surface appear pliable. By raising and lowering the diffusion we can actually make the skin appear more leathery in places. This is important when the skin has had years of exposure to the sun, which is the case with Dr. Dread.

If your program doesn't have diffusion, don't worry, you can simply skip the diffusion map segment of this tutorial. You will also need to darken your skin color map about 25% to compensate for the missing diffusion map. This won't help with the skin texture look, but it will bring the color map to the proper color level.

We'll be using simple planar maps to surface Dread, since they are the most common and the most effective for this type of surfacing. We'll cover the process behind making a color, bump, specularity and diffusion map. I'll also show you how to remove the seams between the image maps.

OK, now that we have that behind us, we're ready to begin. The first thing we need to cover is the character biography so we can properly surface Dr. Dread. The biography will tell us what his skin will look like by illustrating his habitat and life experience. Let's take a look at his biography.

Dr. Dread's Biography

Dr. Dread, shown in Figure 1, is a mad scientist of sorts. He is on a quest to build the perfect creature using human body parts. Yes, it's a bit morbid but he's pretty good at what he does.

Dr. Dread is 64 years old and of German decent. He lives in an old abandoned church in Detroit. No, not all mad scientists come from Transylvania. Dread spends most of his time during the day observing humans at the local malls, movie theaters, beaches and parks. He does this to gather behavioral information for use in his experiments.

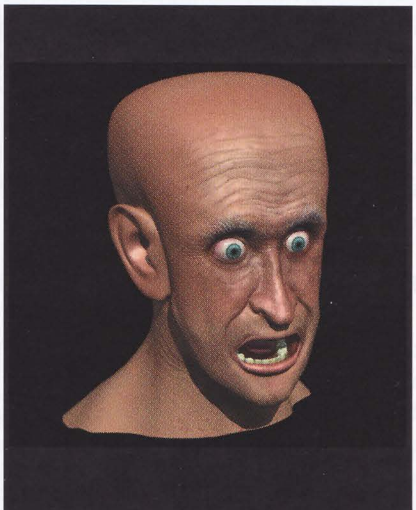


Figure 1 Dr. Dread's Head.

In the evening, Dread goes in search of test subjects. These unfortunate individuals are usually transients he discovers in the back alleys of motor city. He then takes the subjects back to his lab and begins his twisted experiments.

You can probably gather that Dread doesn't sleep much. In fact, nobody has actually seen him asleep in years. I'm sure he catches the occasional catnap here and there but sleep is a non productive time, as Dread will tell you.

Well, that's the long and short of it. While it's not a very lengthy biography, it tells us enough to surface Dread's head in this tutorial.

Now that we have the biography, we can determine the finer surfacing details as described in the biography. First, we can assume that Dr. Dread has relatively dry and leathery skin on his cheeks and forehead. Why? Because he's of German decent. Germans tan very well and quite frequently, so Dread probably spent a great deal of time in the sun as a youth. This means the skin has gotten rather leathery in his old age. He would still maintain a bit of a tan because he spends much of the day wandering around studying people at the beaches and parks.

We can also assume that Dread has rather wrinkled skin because he's 64 years old and has spent a great deal of time in the sun, which would tend to enhance the aging process. In addition to his wrinkles, we can assume he has liver spots, which are common with older people and particularly those who spend plenty of time in the sun.

Finally, the crowning element of his surfacing would be the signs of his sleep deprivation. Immediately, we can assume he has dark rings around his eyes. We can also assume that he doesn't shave regularly, so he probably has some stubble on his chin and neck.

Well, that about does it for the primary surfacing details. Now that we have a good idea of what to include, let's get down to actually doing it.

Surfacing Dr. Dread's Head

The first step in surfacing Dr. Dread is to create the painting template. Since most of the detail is on the front of the face, we'll start there. Before we begin you should download the "issue2photoshop.zip" file from the support site located at www.serious3d.com/support. Once you have the file downloaded and extracted, load the dreadneutral.dxf file into your rendering program.

Now, we need to render out a painting template. First, rotate the model so it's facing the camera. Dread was modeled facing the "Z" axis to make bones animation easier. Now point the camera directly at the model and set the camera zoom to 1000 or greater. This will force the image into an orthographic view so your template will be accurate. You want the template to be void of perspective so your image maps will match the model. When you have the camera positioned properly, render out a template of the head at a resolution of around 1000 pixels tall. You can either use a limited region to crop the image to the dimensions of model before you render, or simply crop it afterward in Photoshop. It makes no difference.

Once you have the template rendered, load it into Photoshop and crop it to the exact shape of the model, if you haven't already done so. Your template should now look like the one in Figure 2.

OK, now that we have our template, we can begin painting the image maps. We'll start with the bump map since it will define much of the color map detail. Before we actually start painting, let's take a look at the details we'll be adding. Figure 2 shows the location of the bump details.

A. Forehead wrinkles: We'll need to add some wrinkles for the forehead as well as some large skin pores, which will make him appear older.

B. Eye Wrinkles: We'll need to add several deep creases around the eyes to help depict his age.

C. Nose Pores: Older people tend to have larger pores on their noses, particularly if they've spent a great deal of time in the sun, so we need to add some to Dr. Dread to reinforce his age.

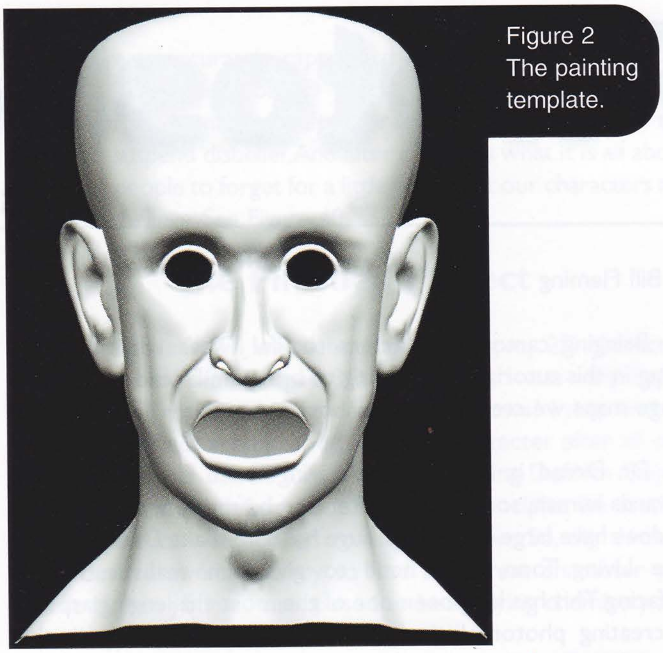


Figure 2 The painting template.

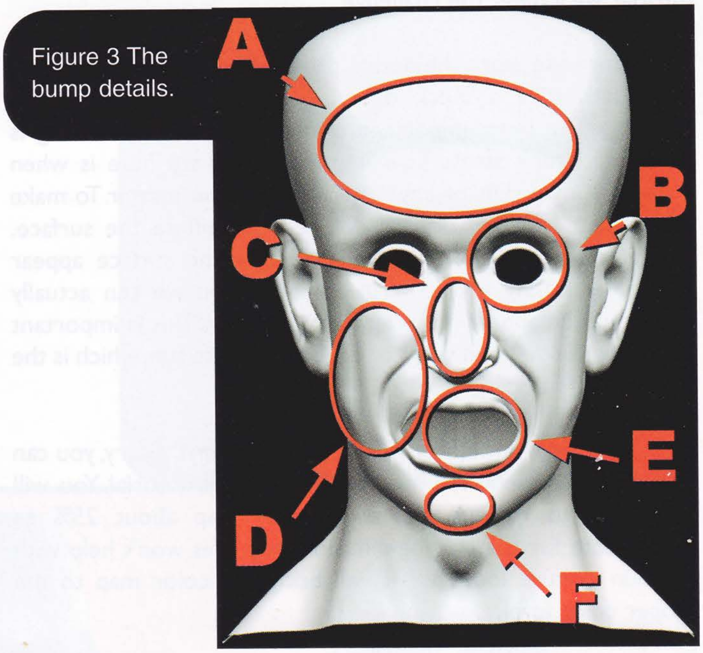


Figure 3 The bump details.

D. Jaw Wrinkles: As we get older we tend to show jaw wrinkles from years of facial expressions. Dr. Dread is very expressive, so we need to add some heavy wrinkles around the jaw.

E. Lip Creases: As we age, our lips become dry and taught, so we need to add some creases to Dr. Dread's lips.

F. Chin Pores: Another common location of large pores on older people would be the chin.

Now that we have a good idea of the types of details and their location, we're ready to get started on the bump map. Creating the facial bump map.

1. To create the bump map, add a new layer and name it Bump. Then fill the layer with RGB 100, 100, 100

2. Now set the opacity of this layer to 50% so we can see the template below.

3. Here's one of my favorite tricks for creating bump maps. Instead of painting them with a color brush, we'll be burning and dodging the fill color on the bump layer. It's a unique approach, but very quick and effective. Select the Dodge tool and set the Exposure to 40%. Then set the brush size to 40 pixels.

4. Now paint seven lines along the forehead, making sure to follow the contour of the head. The lines should extend to the edge of the eyes and stop just above the brow vertically. Just paint a single stoke for each line.

5. Once you have finished, select the Burn tool and set the Exposure to 16% and the brush size to 27 pixels. Now paint strokes between the Dodge lines you just created. This will help to add depth to the wrinkles in the forehead.

6. The next step is to add the deep creases. Set the Burn tool exposure to 50% and the brush size to 10 pixels. Now paint thin, dark lines over the burn strokes you just created. When completed, select the Smudge tool and set the Pressure to 47% with a brush size of 27 pixels. Now stroke the ends of the creases until they taper to a fine point as shown in Figure 4.

Tapering the bump will create a more gradual and realistic flow into the bump. Now that we have the creases completed we can add the skin pores.

7. First, select the Burn tool and set the Exposure to 75%. Then set the brush size to 6 pixels and lay down a bunch of dots covering the area of the forehead wrinkles as shown in Figure 5.

All right, now the forehead bump is finished. Our next step is to create the wrinkles around the jaw. Why? Because they require a bump that raises the tissue, which means we have to apply the Dodge tool first, then the burn tool. All of the other facial bump features require just the Burn tool, so they need to be the final layer we apply. Let's get started on the jaw wrinkles.

Applying the Jaw Wrinkles

1. The jaw wrinkles are created the same way as the forehead. We start with the large Dodge brush to paint the wrinkles and then Burn the creases. The jaw wrinkles are less prominent than the forehead on Dread, so we'll start with a Dodge tool with an Exposure of 30% and a brush size of 21 pixels.

2. Now, stroke the creases around the jaw and lower eye as shown in Figure 6.

3. Figure 6 The jaw creases.

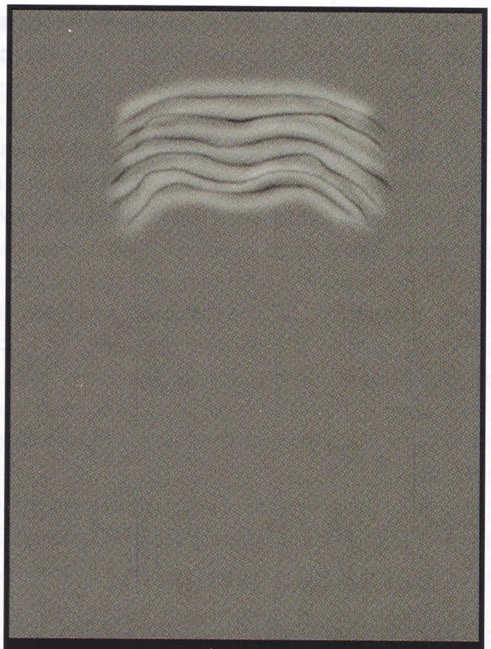


Figure 4 The forehead creases.

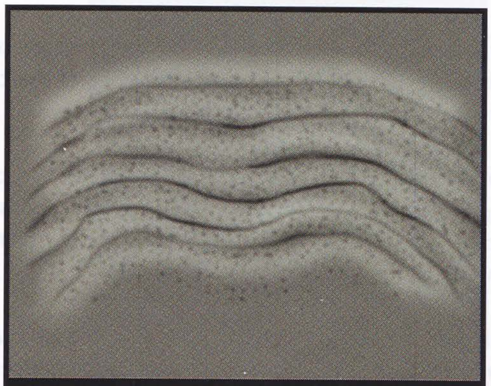


Figure 5 The forhead skin pores.

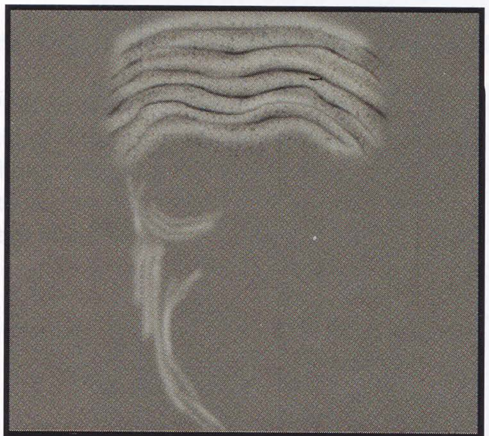


Figure 6 The jaw creases.

4. Now select the Burn tool and set the Exposure to 16% and the brush size to 17 pixels. Now paint strokes between the Dodge lines you just created. This will help to add depth to the wrinkles.

5. Next, add the deep creases using the Burn tool with an Exposure of 50% and the brush size to 10 pixels. Now paint thin, dark lines over the burn strokes you just created. When

completed, select the Smudge tool and set the Pressure to 47% with a brush size of 15 pixels. Stroke the ends of the creases until they taper to a fine point as we did earlier.

6. Select the wrinkles we just created with the Lasso tool and feather the selection 5 pixels. Now copy, past and mirror the selection. Then move it into position over the right side of the face as shown in Figure 7.

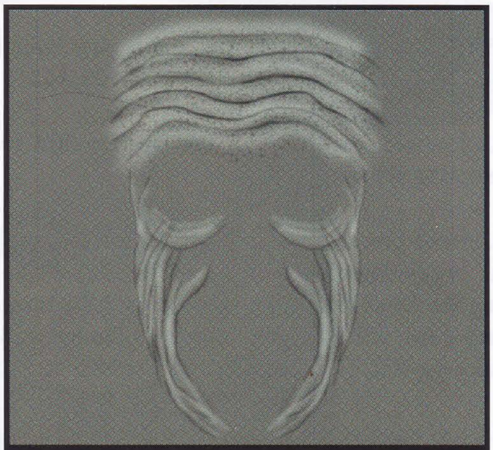


Figure 7 A closup of the jaw wrinkles.

This is the foundation of the face, so we can make it symmetrical. We'll make the finer wrinkles and creases asymmetrical to make the character realistic.

OK, now we are ready to add the fine wrinkles around the eyes and forehead.

Creating the eye and forehead wrinkles

1. Select the Burn tool and set the Exposure to 30%, with a brush size of 6 pixels. Now start laying down wrinkles around the eyes and up into the forehead, as shown in Figure 8.

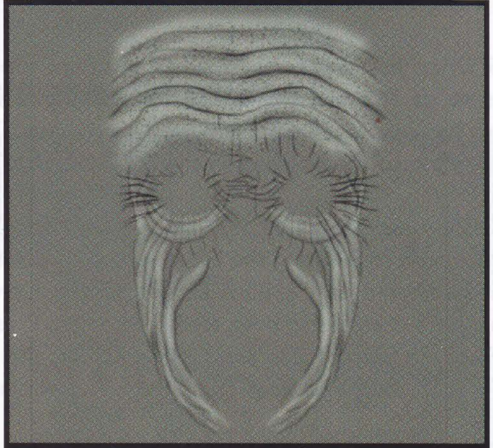


Figure 8 Creating the eye creases.

2. Now select the Smudge tool and set the Pressure to 47%, with a brush size of 5 pixels. Then taper the ends of the creases by pulling them out with the Smudge tool.

3. Now we need to add some height between the creases so they pop off the skin. Select the Dodge tool and set the Exposure to 28% and a brush size of 13 pixels. Now paint light strokes between the creases as shown in Figure 9.

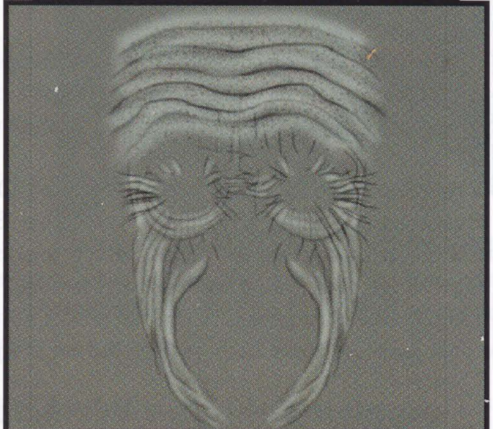


Figure 9 Adding height between the creases.

It's really starting to come together now. We're almost done with the bump map. We have three areas left to complete — the chin, nose and mouth. Let's get the nose and chin out of the way now, since they are simple to create.

Creating the nose and chin pores

1. Select the Dodge tool and set the Exposure to 100% with a brush size of 6 pixels. Now start dropping dots on his nose and chin. Place the dots closer together on the chin and farther apart on the nose. After you have scattered the white dots, select the burn tool with the same settings and add the black dots until you have something resembling Figure 10.

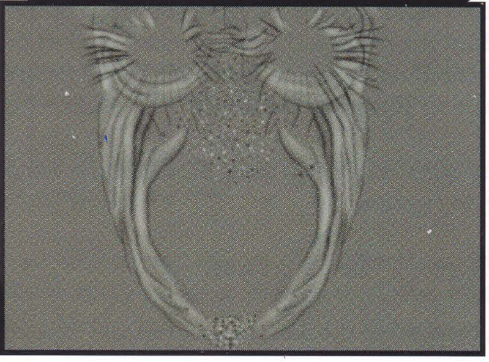


Figure 10 The nose and chin pores.

Well, that was easy. Now we have just one element left — the Lips. lets get started.

Creating the lip bump

1. Select the Dodge tool and set the Exposure to 40%. Then set the brush size to 13 pixels. Then paint lines vertically down the area above the lip, and horizontally under the chin as shown in Figure 11

2. Now select the Burn tool and set the Exposure to 20% and the brush size to 8 pixels. Paint strokes between the Dodge lines you just created.

3.The next step is to add the deep creases. Set the Burn tool exposure to 50% and the brush size to 5 pixels. Now paint thin, dark lines over the burn strokes you just created and add a few lines chaotically around the lips. When completed, select the Smudge tool and set the Pressure to 32%, with a brush size of 6 pixels. Now stroke the ends of the creases until they taper to a fine point, as shown in Figure 12.

You should also run the Smudge tool along the length of the darker lines, to feather them so they won't be so harsh. Now all we need to do is add some small creases to the lip and this facial bump map is finally done!

Creating the lip creases

1. First, we'll start with the high areas of the lip bump. Select the Dodge tool and set the Exposure to 30%. Then set the brush size to 8 pixels. Paint lines vertically along the upper and lower lips. Apply more lines to the lower lip as shown in Figure 13

2. Now select the Burn tool and set the Exposure to 20% and the brush size to 8 pixels. Paint strokes between the Dodge lines you just created. We're using the same size brush to burn which will soften the wrinkles on the lips.

3. Like step 3 in creating the lip bump, the next step is to add the deep creases. Set the Burn tool exposure to 28% and the brush size to 4 pixels. Paint thin, dark lines over the burn strokes you just created and add a few lines chaotically around the lips. When completed, select the Smudge tool and set the Pressure to 32% with a brush size of 6 pixels. Now stroke the ends of the creases until they taper to a fine point.

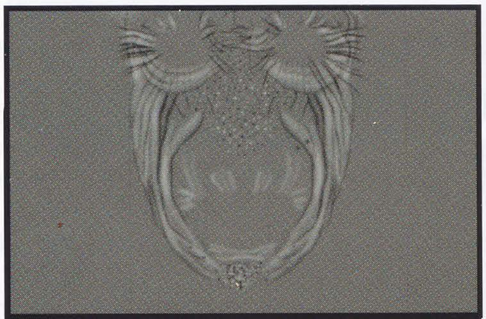


Figure 11 The Dodge strokes for the mouth wrinkles.

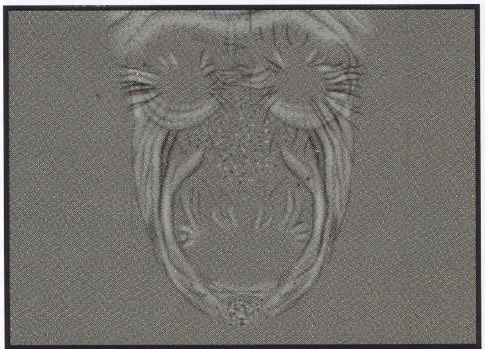


Figure 12 The deep creases around the mouth.

You should also run the Smudge tool along the length of the darker lines to feather them so they won't be so harsh. When you're finished you should have a completed facial bump like the one shown in Figure 14.

Looks great doesn't it? As a finishing touch you might want to add a few skin pores around the skin over the upper lip and the eyebrows.

Now we need to save a copy of this bump map as something like "facebump". Save the file in your format of choice. Once it's saved, load the file into your rendering program and planar map

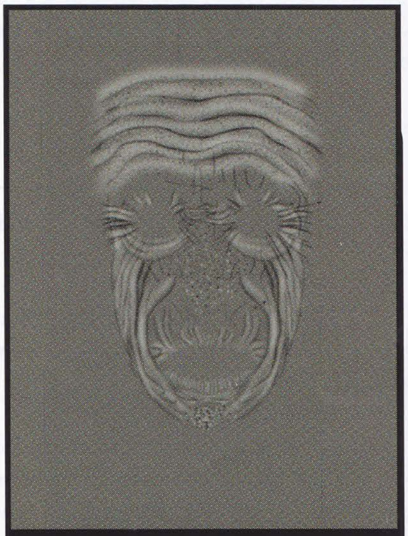


Figure 13 The high points of the lip bump.

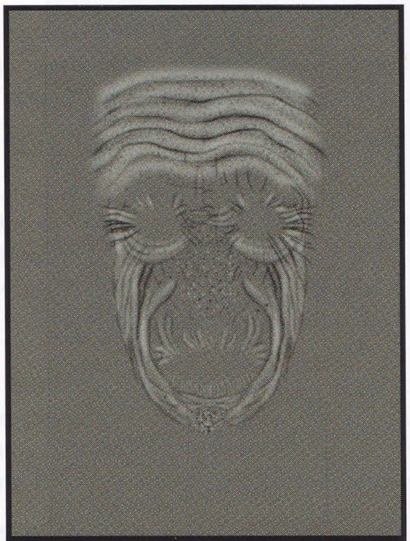


Figure 14 The completed facial bump map.

the image along the "Z" axis in you Bump layer. Then set the bump value to 100%. If your program allows for greater than 100% you should set it to 200%. Now do a test render. You should have something resembling the image in Figure 15.

Now we're getting somewhere. Dr. Dread is starting to come to life. Take a look at those wrinkles around the jaw. Notice how the skin is already starting to look taught and leathery. It's an awesome effect. Now that we have the foundation of our surfacing we can begin the color map, which is a great deal easier to paint than the bump.

Creating the Color Map

We will be creating the color map for use with a Diffusion map. When you diffuse a surface the color map is relatively simple. We let the diffusion do most of the work so the color map is simply a few strategically placed shades of skin tone. If you are unable to use a Diffusion map you should darken the color map we create by 25%. It won't give you the same effect as diffusion but it will work.

OK, let's get down to business.

1. To create the color map, add a new layer and name it Bump. Then fill the layer with RGB 197, 124, 87, which is the base skin tone for Dr. Dread.

2. Now set the opacity of this layer to 50% so we can see the template below. Be sure to deselect the bump layer so it isn't showing.

3. The first thing we'll do is add the color for his sun tan. This will cover the top of his dead, down to his nose. The jaw will be lighter because the skin is scraped off when he shaves. Select the following color: RGB 192, 103, 69. Now select the Airbrush tool and set the Pressure to 60% and the brush size to 100 pixels.

4. Paint the area from the bottom of his nose to the top of his head. Then, use the eyedropper tool and sample your base skin color. Using the same brush, paint a light spot on the forehead as shown in Figure 16.

5. Now we're ready to darken the area around the eyes so he looks like he hasn't slept in days. Select the following color: RGB 161, 81, 53. Now select the Airbrush tool and set the Pressure to 10% and the brush size to 65 pixels. Now paint the area just around the eye as shown in Figure 17.

6. Great. Now we can darken the nose and lips. Set your brush to RGB 196, 89, 63 and set the pressure to 21% with a brush size of 27 pixels. Then, chaotically paint splotches of the new color on the nose, then cover the lips with the same color as shown in Figure 18.

7. Now we're ready to add the age and liver spots using the Dodge and Burn tools. First, using the Dodge tool, place

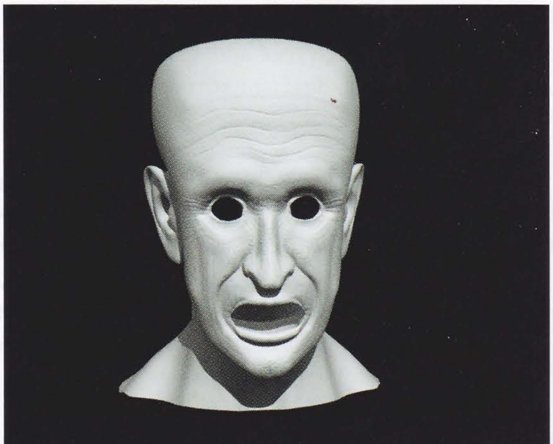


Figure 15 The facial bump map applied to the model.

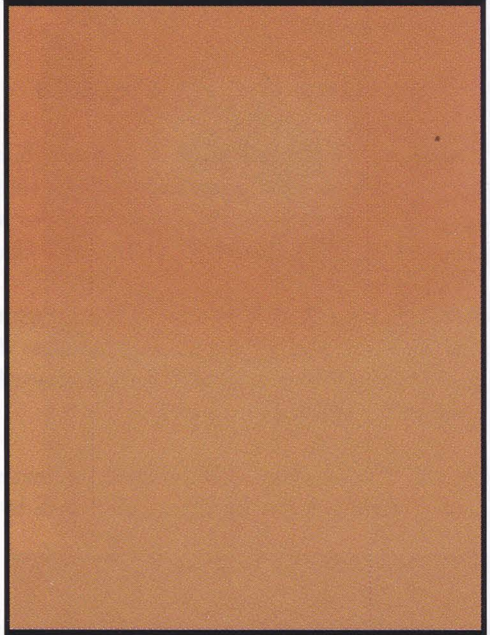


Figure 16 The tan area applied.

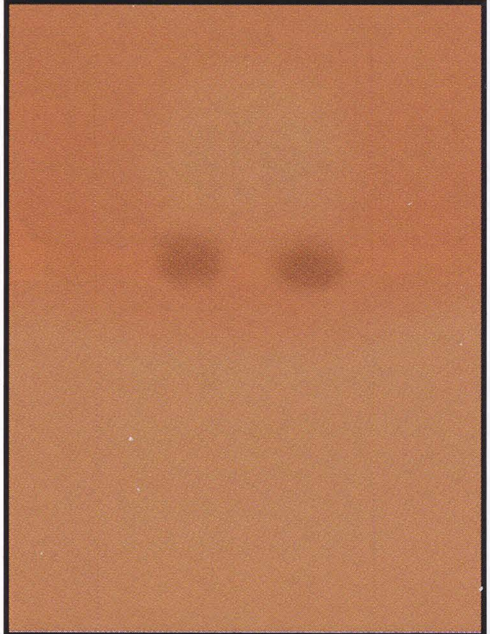


Figure 17 Darkening the eye region.

some light spots around the edge of the forehead and under the eyes. Repeat the same process with the Burn tool to create dark spots as shown in Figure 19.

8. The next step is to add some blush to the cheeks below the eyes and on the nose. This will make the skin appear to be slightly burned by the sun. Set your brush color to RGB 195, 87, 66. Now make the Pressure 17% with a brush size of 100 pixels, and dab the brush over the cheeks and nose until they are slightly pink.

OK, that's the main details of the color map. You can see that it's starting to come together. Now we need to add the little details that really make the surface come to life.

Adding the small details

The first thing we need to do is add some color variation to the lips. Basically, we're going to use the Dodge and Burn tool to lighten and darken areas of the lip.

1. Select the Dodge tool and set the Exposure to 15 and a brush size of 17 pixels. Draw some lines vertically through the upper and lower lip, leaving the same volume of space between them as the thickness of the line. Now select the Burn tool with an Exposure of 15% and a 17 pixel brush and paint darker spots between the light spots on the lips. Keep the bulk of the color closest to the mouth, as shown in Figure 20.

2. The next step is to add some age spots around the mouth. This is easily accomplished with the Burn tool using an Exposure of 45% and a brush size of 5 pixels. Just drop some red dots around the perimeter of the lips and a cluster on the chin.

Finally, the last element of our color map — the veins. Dr. Dread is fairly thick-skinned but does have some vericose veins on his nose. Select the following color: RGB 102, 89, 99 and set the Pressure to 22% with a brush size of 3 pixels. Paint some tiny veins running up the side of the nose, as shown in Figure 21.

Well, there you have it — the completed color map. Save a copy as "facecolor" and let's continue. Now you're ready to create the diffusion and specularity maps. We'll start with the diffusion map.

Creating the Diffusion map

1. Creating a diffusion map is somewhat tricky. What we need to do is combine the color and bump layers so we can diffuse the cracks as well as the skin tone. To do this, move the color layer over the bump and set the color Opacity to 90%. This blends the two layers.

2. Now save a copy as "facediffuse" and load the image just saved. Convert the image to grayscale. Open the Levels panel and enter the following settings:

Input Level: 0, .54, 190
Output Level: 53, 255

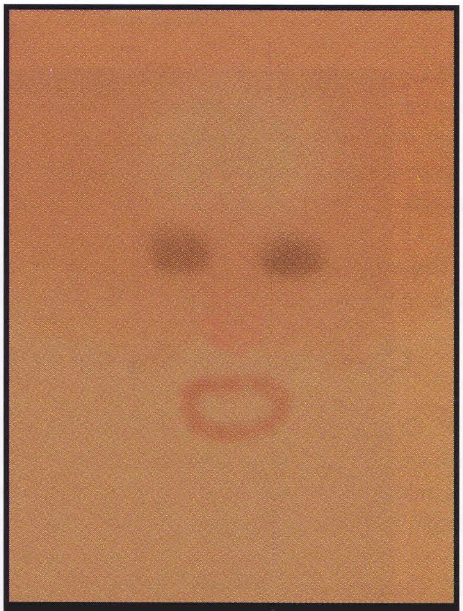


Figure 18 Detailing the nose and lips.

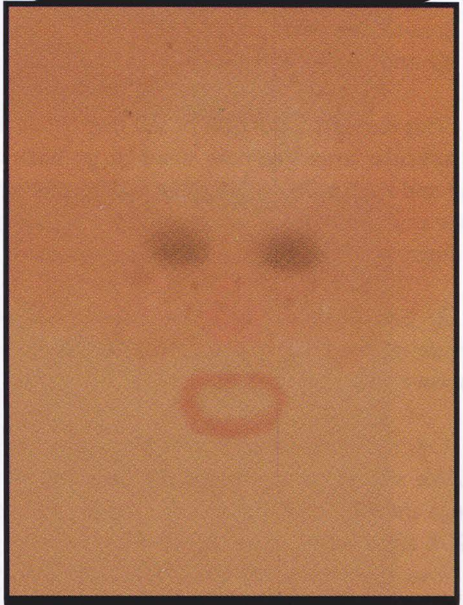


Figure 19 Creating the age spots.

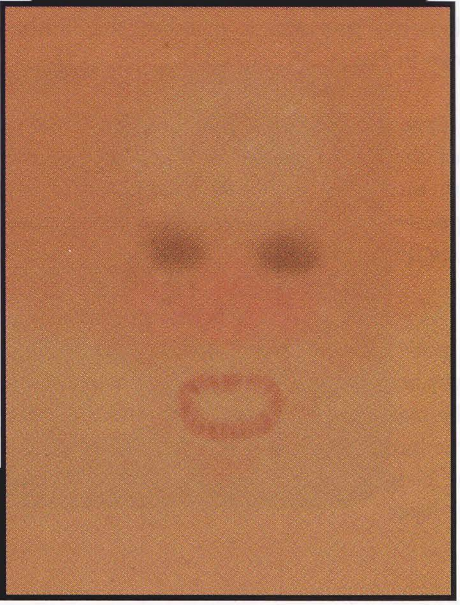


Figure 20 Adding detail to the lips.

3.Open the Brightness/Contrast panel and set the Contrast to 21. This process will darken the age spots and lighten the rest of the image map. We want the age spots and tan area diffused more than the basic skin tone, so we needed to tweak the image a bit.

You now have the proper diffusion map for Dr. Dread's face, shown in Figure 22.

Creating the Specularity map

1. Creating a Specularity map involves two steps. First, we tweak the diffusion map, then we touch it up. What we need to do is make the areas around the forehead, eyes, nose, cheeks and chin more specular than the rest of the head.

2. Open you "facediffuse" image, then open the Levels panel and enter the following settings:

Input Level: 132, .83, 231
Output Level: 0, 255

This darkens a portion of the map while lightening some of the specular area. We now need to go back and touch up the nose and lips so they are lighter, but first we need to darken the lower portion of the map around the face. We want the rest of the head to be a consistent specularity.

3. Sample the dark color outside the face (in the upper portion of the image) and paint the area surrounding the face, as shown in Figure 23.

OK, now we need to lighten the area around the nose and lips. We also need to darken the chin. To do this, we'll use the Dodge and Burn tools. Select the Dodge tool and set the Exposure to 20% and brush size to 100 pixels. Now, stroke the area around the nose, cheeks and lips until they match the forehead.

Next, select the Burn tool with the same settings and darken the jaw until it matches the finished Specularity map shown in Figure 24.

Save the image as "facespecular." Finally, we are done with all of the image maps for the face. The next step is to take them into our rendering program and apply them to their respective attribute layers. The finished result should resemble Figure 25.

As you can see, Dr. Dread has come to life before our eyes! He now has soft, porous skin with spots, where the skin is taught and leathery from sun exposure. Now if you wanted to really make the skin pop, you'd add a cubic-mapped, small skin pores bump to the surface. This, of course, is only an option if your program allows you to change the mapping method on each layer.

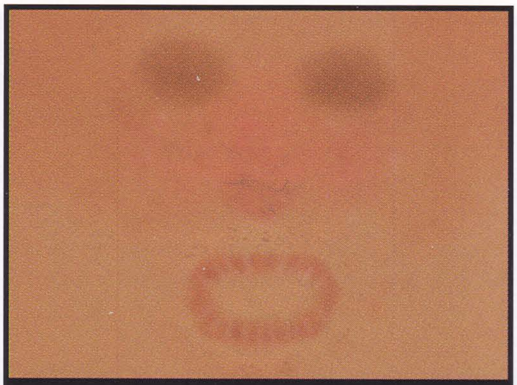


Figure 21 The nose veins.

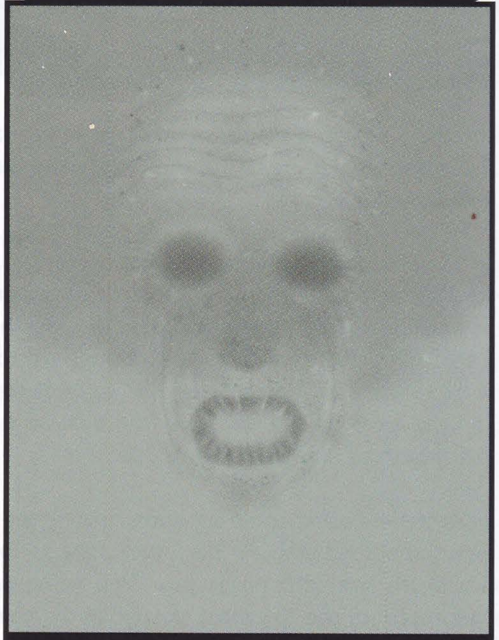


Figure 22 Dr. Dread's diffusion map.

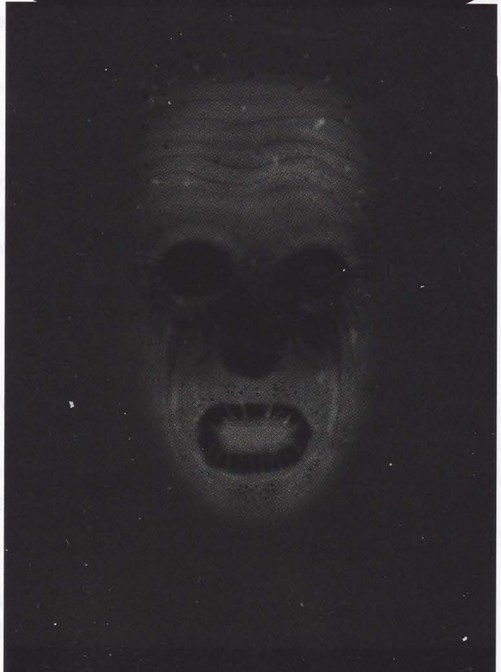


Figure 23 Filling in the head .

Now that we have the front of the model surfaced we can begin working on the sides, which are surfaced with the same process. The only difference is that there is far less detail on the sides. About the only thing we'll see on the other surfaces are age spots, though there will be a few wrinkles on the neck.

Since we don't have the pages to complete the entire head, I'll take a moment to show you how to remove the seams between your surface. You should have no problem surfacing the other parts of the head since they are very simple. You'll find all of the completed image maps for Dr. Dread's head in the support file you downloaded from the Serious 3D website. Take some time to examine them and see how the details were handled. Let's take a look at how we resolve seam problems.

Removing the Seams

In the first issue, we discussed the technique for determining the stretching areas on the model, using a cubic mapped grid texture. That's how you would find the stretching areas on Dr. Dread's head. Create a square image map with a grid, and cubic map it to your model. Where you see the map stretch, is where you need to define a new surface. Dr. Dread has seven surfaces, which are shown in Figure 26.

His head has been broken down into surfaces that can be surfaced with a planar map. It looks a bit complicated but it actually makes it much easier to surface properly. Basically, you start with a model that is one surface and create the image maps that cover the entire surface of the model from one axis. Then you go back and start breaking down the individual surfaces. Why? Well, for a number of reasons, but the main one would be removing the seams.

You see, when you surface the model with one surface to start, you now have maps that stretch around the model. This is actually desirable for removing seams. What you do is save the surface for the whole model so you can load it later. Then, you use the cubic grid to determine the stretching areas. Once you have the surfaces defined, you load the model into your rendering program and apply the surface you saved earlier to ALL of the new surfaces. The model now looks as it did when you had one surface.

The next step is to render out the templates for the new surfaces. The first thing you do is set the camera to a zoom of 1000 or greater. Then, you rotate the model to shoot the desired surface. Make sure the entire model occupies the screen (This is important for scaling.) Now make all surfaces except the one you are rendering, transparent. Now render the template. I've done this for the side of Dr. Dread's head. You can see the template in Figure 27.

The image is sized to the full height of the head but we can only see the surface we are going to edit. This technique is invaluable for ensuring the image maps are all scaled properly. If we surfaced the side, with an image map larger than the front,

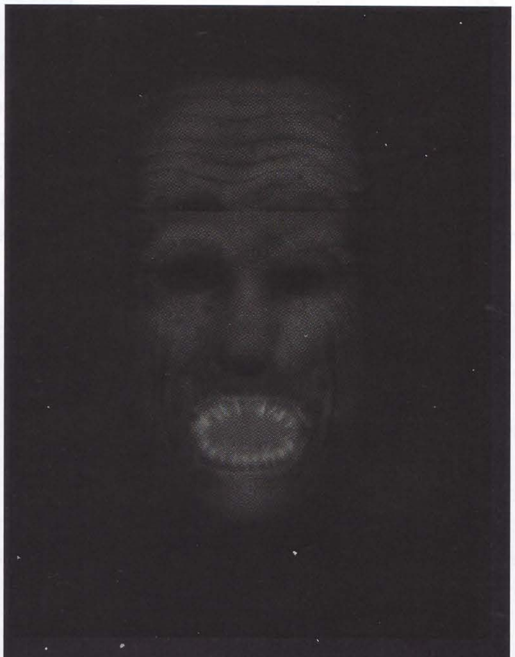


Figure 24 The completed Specularity map.

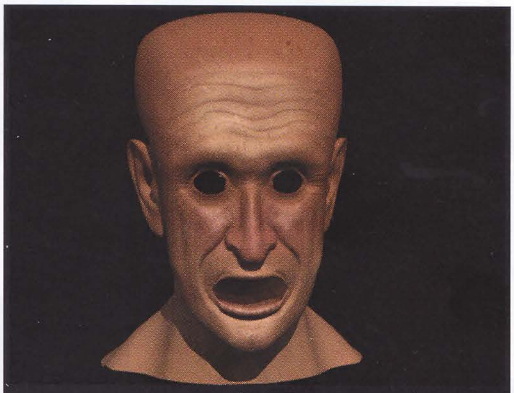


Figure 25 Dr. Dread's completed facial maps.

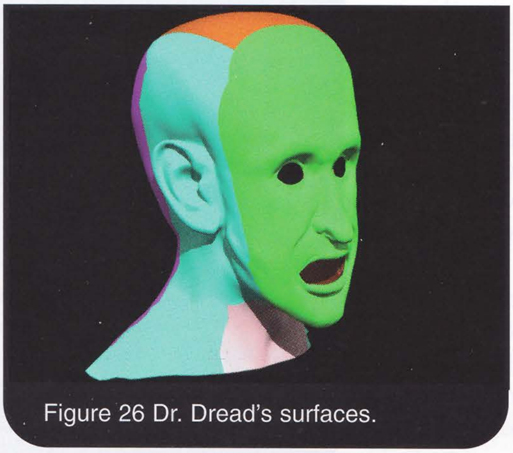


Figure 26 Dr. Dread's surfaces.

we would have a mismatch, particularly if we had a lot of detail on the surface.

Once you have the template rendered, load it into Photoshop. Then, scale it to be the same height as your original face template. Now you are ready to begin painting. To guarantee you have the proper colors and alignment, I suggest you copy the edge of the face map that seams with the side, and past it on a layer in the side template, as shown in Figure 1.28.

Now you can sample the colors from the front map portion, so the side will be seamless. You can also move the piece of the front map over the edge of the side map and use it as the foundation for your surfacing. This will guarantee the image maps are seamless.

When you have completed all of your image maps for the side, the last step you need to take, is to crop the template to the actual size of the surface. If you forget to do this, your maps will be way off target.

This is a great technique for removing the seams on your surfaces. It will take a bit of getting used to but the payoff is well worth it.

Take some time to try this technique on Dr. Dread's head. The model with all of the surfaces assigned has been provided in the support file. Load the "dreadsel.dxf" model into your render program and create your template. Then try your hand at surfacing the side of the head. You'll find it's a very simple process compared to the front.

Wrap Up

Surfacing a Living Toon can be a great deal of entertainment, particularly if the character is more cartoony than Dr. Dread. It's great to see a cartoon character come to life. It's also a bit eerie. Just remember: there is no detail too small when creating your image maps. The more detail you add, the more the character comes to life. Hang in there and keep on pushing the threshold of 3D graphics!

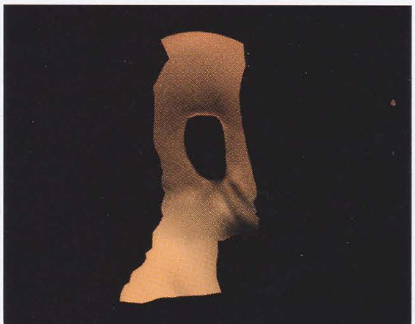


Figure 27 the side template.

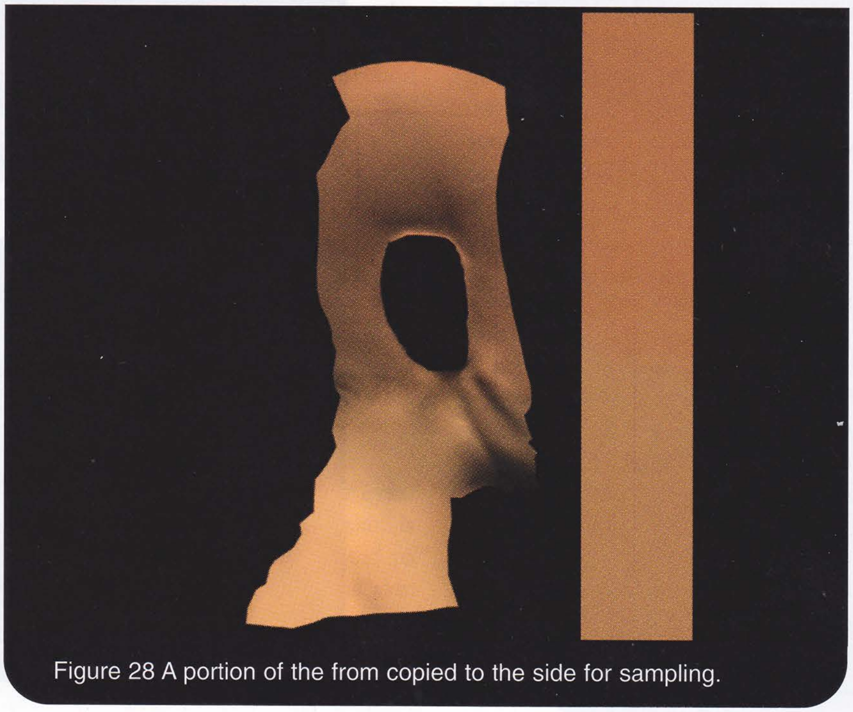


Figure 28 A portion of the from copied to the side for sampling.

RayDream

Creating a Living Toon in Ray Dream Studio

By John Sledd

When I was first approached about doing this tutorial, the first thing that popped into my head was the first thing that always pops into my head…"What in the hell am I going to use as subject matter?" It didn't take long to figure out that the best character for this tutorial was one I'd already created in my own cartoon style. Figure 1 is an illustration I did a couple of years back of a character named Potlatch Simms. I originally created this style of cartoon in Adobe Dimensions, and Potlatch was my first attempt at transferring the style to Ray Dream Studio (RDS).

Potlatch is just like any other baby with one exception — he's evil and bent on world domination. Many parents may argue that all babies are bent on world domination, but I'll bet they've never found a world domination outline sketched out in their baby's own handwriting. Potlatch is *evil*. Trust me.

Considering that Potlatch is a pioneer of sorts already, I thought he'd make the perfect subject for our Living Toon experiment. That and the fact that his agent is trying desperately to catch the wave of America's current fascination with creepy babies.

Potlatch's level of dementia is difficult to capture, so we had better get started.

Heads Up

As you can see, Potlatch's original head is pretty much just an extrusion with added details such as the eyes, teeth and cheeks. For a Living Toon, this simply won't do. I chose to start the head using the metaballs plug-in called Blubble, by RAYflect, Inc. (www.rayflect.com). Metaballs, in cooperation with some slight tweaking in the MeshForm modeler (if necessary), is the best way I've found to get the nice rounded curves needed for a juicy, fat baby like Potlatch.

The Main Part of the Head

The first thing I did was add a Blubble object to my scene. I did this by selecting RAYflect Blubble from the Insert menu. When the Blubble modeler opens, begin by creating a large positive sphere for the main part of the head, as in Figure 2. Basically, what I'm doing here is starting with the largest part of the overall head, and working my way down, so the cheeks will be next. Before you go on to the cheeks, however, choose Surface Threshold from the Geometry menu and change it to 55%. I found this setting the best for getting Potlatch's curves the way I wanted them.

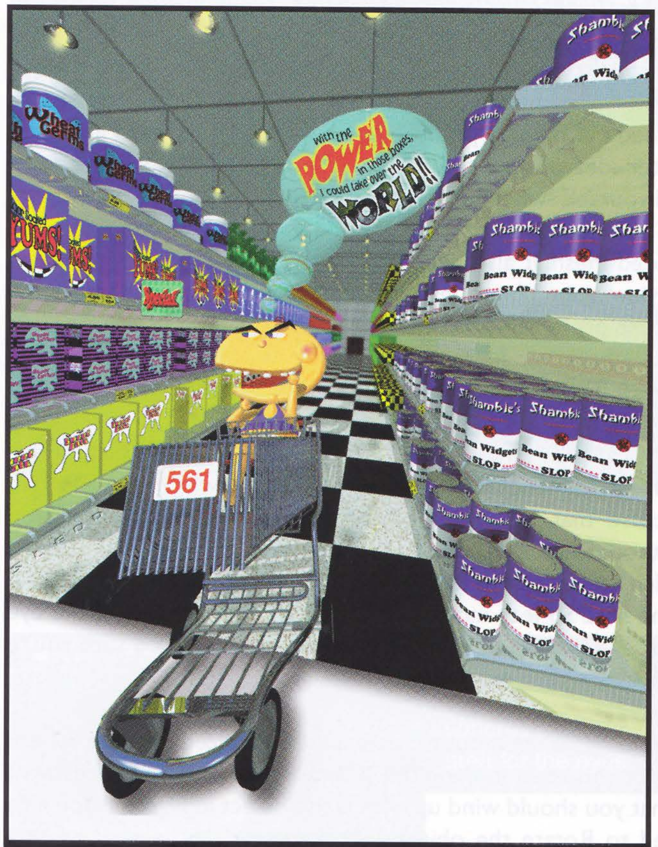

With the POWER in those boxes, I could take over the WORLD!!
Wheat Germs
Shamble's
Bean Widgets
SLOP
561

Figure 1. The original illustration of Potlatch Simms, entitled "Potlatch Goes Shopping," was originally done in Ray Dream Studio 4.

Next, I added the cheeks by creating two smaller positive spheres. The easiest way to do this is to create one sphere and then duplicate and position it relative to the first sphere. Then you can shift-select the two spheres and move them both into position at the same time. Figure 3 shows our two cheek spheres in front of our main head sphere. You'll find that creating each metaball object away from other metaball objects in the modeler window and then dragging one or the other into place, will aid your workflow. There will be times when you find it difficult to select overlapping objects, and will have to move the objects that are in the way in order to get to the objects you wish to edit. Keep this in mind, because we'll be doing more of it later. Usually the head is the easiest to move because it's the biggest, is only one object and is usually the one getting in the way.

Now, to check how your cheeks will blend with the head, select the head and move it forward until it starts blending with the cheek objects. Figure 4 shows what you should wind up with. Feel free to move to whatever view suits you best for the proper positioning. Double-check your positioning with multiple views to make sure everything is lined up properly.

The next thing you should add is the chin. I created my chin by duplicating one of the cheek objects, scaling it down slightly and then moving it into position. Figure 5 shows the proper placement of the chin object. If you have trouble selecting one of the cheek objects for duplication, remember to move the head back out of the way. I've switched the preview to Shaded Primitive to give you a better idea of the placement and sizes of the chin and cheek objects. However, I find it better to work in Shaded Mesh when positioning the objects. This way I can get a better idea of how the objects interact with each other. You'll find yourself switching preview modes often to get the best view for your particular task. Figure 6 shows the same view as a Shaded Mesh. It also helps to click Done from time to time to preview your object in the Perspective window. Although the Blubble preview is pretty good, it's a far cry from how the object will actually wind up looking. Figure 7 shows our head with cheeks and chin as it appears in the Perspective window.

That about does it for the positive objects we'll be working with on the face. All that's left is the nose, which we'll do last, because that fits with our larger to smaller object creation method. Since the nose is composed of many smaller objects which are difficult to keep track of, it's best to get the larger stuff done first. So let's move on to creating the mouth and the eye sockets. These will be negative sphere objects, so be sure you're using the Negative sphere tool to create them.

To make the mouth, create a medium-sized negative sphere object and scale it along the X and Y axis (and Z if necessary.) What you should wind up with is the object in Figure 8. You also need to Rotate the object approximately -16 degrees around the X axis, which is shown in Figure 9. Figure 10 shows the placement of the negative mouth object. Figure 11 shows what your Shaded Mesh preview should look like at this point. We can see Potlatch really coming together at this point.

Our next step is to carve out the eye sockets. We'll be modeling the eyes separately, but we need somewhere to stick them when we're done. Again, we're going to create a couple of

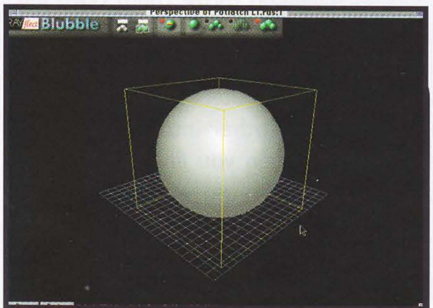


Figure 2. Start the head off, in Blubble, with a positive sphere.

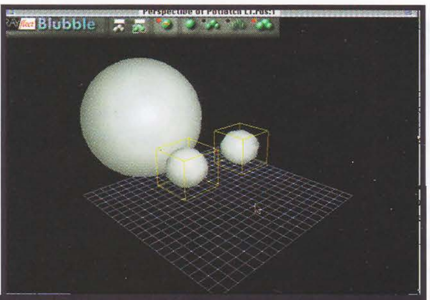


Figure 3. Creating your metaball shapes out away from other shapes makes selection and positioning much easier.

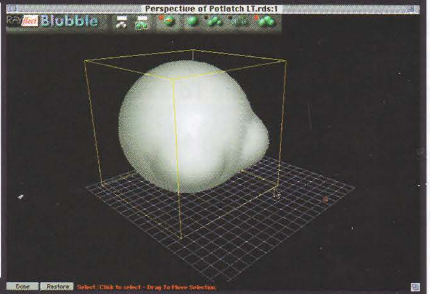


Figure 4. When you pull the cheeks back towards the head object, you'll see the form begin to take place.

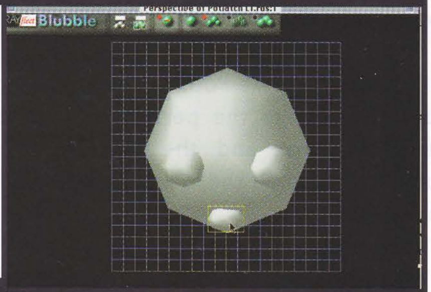


Figure 5. The chin is another positive sphere object. I chose the Shaded Primitive preview option here to make the positioning of the actual spheres more apparent.

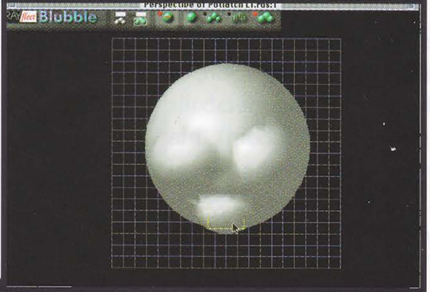


Figure 6. This is the same view but with the Shaded Mesh preview option.

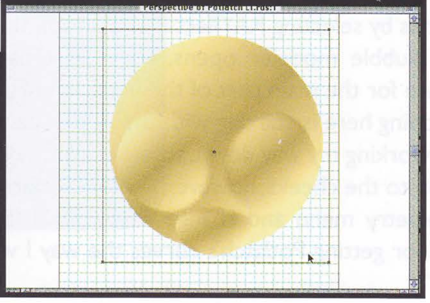


Figure 7. Blubble has a pretty good and very fast preview but it's not an exact match with what you wind up with the the Perspective Window.

negative spheres and position them to push away the areas of forehead that we don't need. Create a negative sphere that is about the size of the chin sphere. Adjust it's scaling to shape it somewhat like a potato, then duplicate and position it. Figure 12 shows our two negative spheres ready for the eye sockets. Now, drag them into position as shown in Figures 13 and 14. If you'd like to preview what things really look like at this point, click Done. Figure 15 is what you should get.

Now, all that's left is to create, in this Blubble object, is the nose. By using the same techniques mentioned above, create and place a series of positive spheres for the main part of the nose, and then two negative spheres for the nostrils. Figure 16 shows the arrangement we're looking for. The two negative spheres are the ones represented by wireframes. Be sure to create the nose spheres away from the rest of the head, and also as close to the correct size as possible. Scaling groups of metaballs doesn't work very well. Also, don't worry about Shaded Mesh preview while working on the nose (It won't look like anything due to the small size of the spheres needed and the resolution of the preview.) Wait until you are positioning them with the rest of the head to turn on Shaded Mesh. Now, move your nose objects into position, as in Figure 17, and then turn on Shaded Mesh preview. Figure 18 is what you should have. This does it for the metaball portion of your head, for now, so click Done. Figure 19 is what you should have at this point. If it's not, feel free to jump back into the Blubble head and readjust the objects until you're pleased with the results.

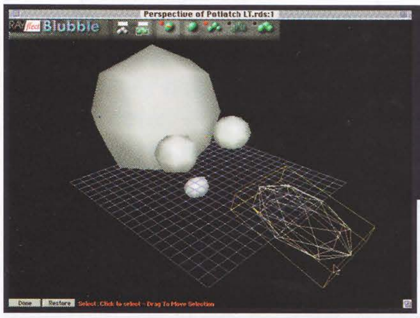

Perspective of Potlatch LT.rds:1
Blubble
Done
Restore
Select: Click to select - Drag To Move Selection

Figure 8. The object for the mouth is simply a scaled and stretched negative sphere.

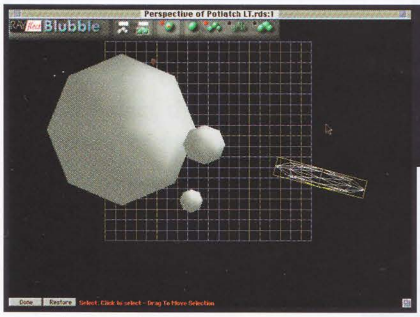

Perspective of Potlatch LT.rds:1
Blubble
Done
Restore
Select: Click to select - Drag To Move Selection

Figure 9. Rotate the sphere so that the mouth goes up into the head object.

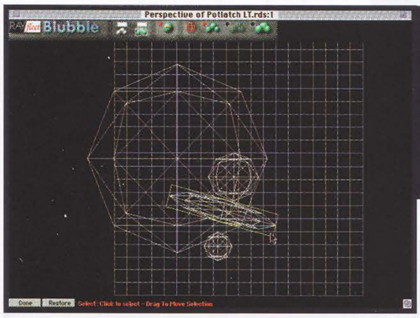

Perspective of Potlatch LT.rds:1
Blubble
Done
Restore
Select: Click to select - Drag To Move Selection

Figure 10. This figure shows the proper placement of the negative mouth object.

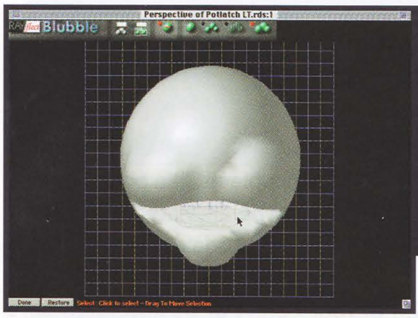

Perspective of Potlatch LT.rds:1
Blubble
Done
Restore
Select: Click to select - Drag To Move Selection

Figure 11. Once the mouth is in place, the Shaded Mesh preview shows the negative space created by the mouth object.

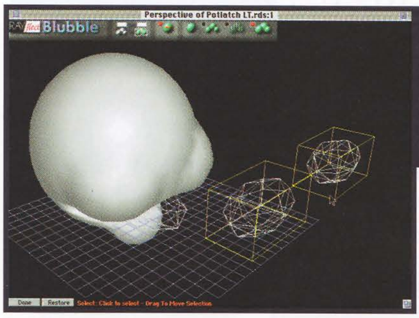

Perspective of Potlatch LT.rds:1
Blubble
Done
Restore
Select: Click to select - Drag To Move Selection

Figure 12. Our eye socket objects are shaped somewhat like potatoes.

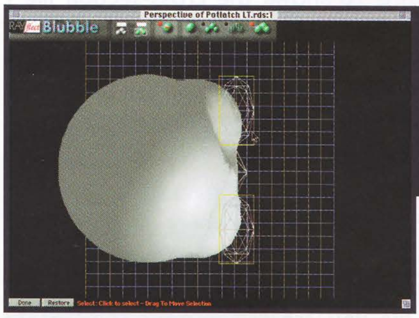

Perspective of Potlatch LT.rds:1
Blubble
Done
Restore
Select: Click to select - Drag To Move Selection

Figure 13. Using a top view, place the eye socket spheres directly in front of the main head object.

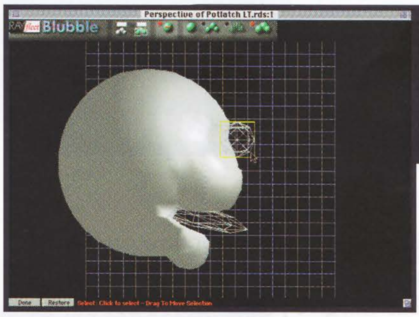

Perspective of Potlatch LT.rds:1
Blubble
Done
Restore
Select: Click to select - Drag To Move Selection

Figure 14. The left view shows how the spheres cut away the area for the eyes.

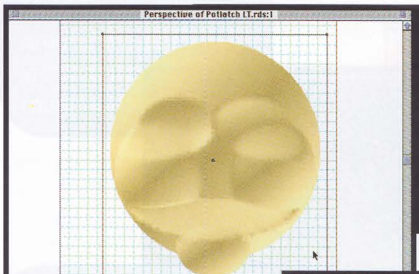

Perspective of Potlatch LT.rds:1

Figure 15. Viewing the Blubble object in the Perspective Window shows Potlatch's head really taking shape.

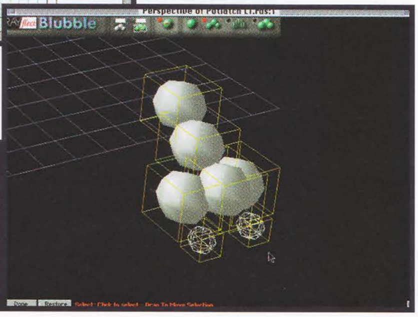

Perspective of Potlatch LT.rds:1
Blubble
Done
Restore
Select: Click to select - Drag To Move Selection

Figure 16. This shows the basic layout of our nose creation primitives.

If you run into strange shading problems...

I have found some problems associated with Blubble objects. Sometimes you get strange surfacing problems, like polygons that render flat instead of smooth. This can be alleviated by opening your Blubble object in the MeshForm modeler and choosing Smooth Edges from the PolyMesh menu. Either create a new master for the mesh version of your object or be absolutely sure you are happy with the Blubble object (Once you convert it to a mesh object, you can't go back to Blubble.)

The Eyes

Now for the eye, we're going to rely on RDS's wonderful Free Form modeler. I have always been an advocate for using a third-party drawing app to create your cross sections for use in RDS and this is no exception. I'm going to create the eye using a simple Torus Extrusion Preset, but I first need a good cross-section to work with. Figure 20 shows the cross-section file I created in Adobe Illustrator for the eye object. Of course, you'd want to leave the text out, and it's also not necessary to color your cross-sections in your drawing app (RDS will just ignore the color info but it can help you visualize your final model.)

From here, you'll want to add a Free Form object to your scene by choosing Free Form from the Insert menu. When the Free Form window opens, name the object 'Lid' and click OK. Now choose Import from the File menu and navigate to (and open) the cross-section file you created in your third party application. If you don't have a third-party drawing app, then just try to recreate the file outlines shown in Figure 21. It's OK to create all of the separate shapes in one cross-section, because that's how we're going to align all of the eye's separate shapes. Once you get your cross-section prepared, let's perform the torus.

Go to the left view in your modeling window and choose Geometry>Extrusion Preset>Torus and click OK to accept the default value of 8 inches. This will give you what you see in Figure

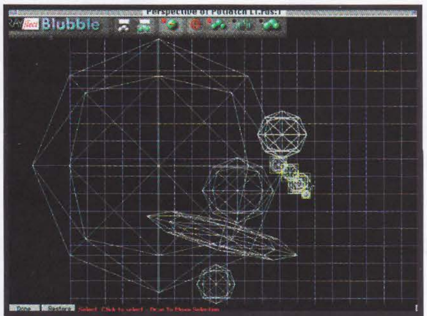


Figure 17. Select all of the nose objects and move them into position.

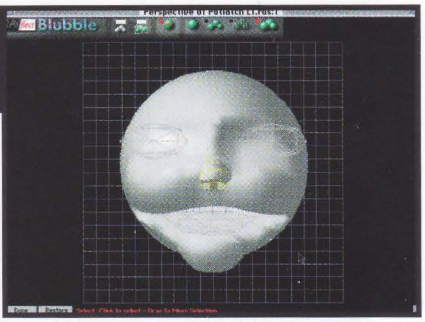


Figure 18. What you should have so far.

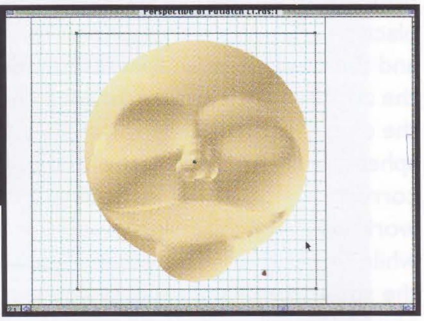


Figure 19. At this point, you should be pretty close to being finished with the overall head object.

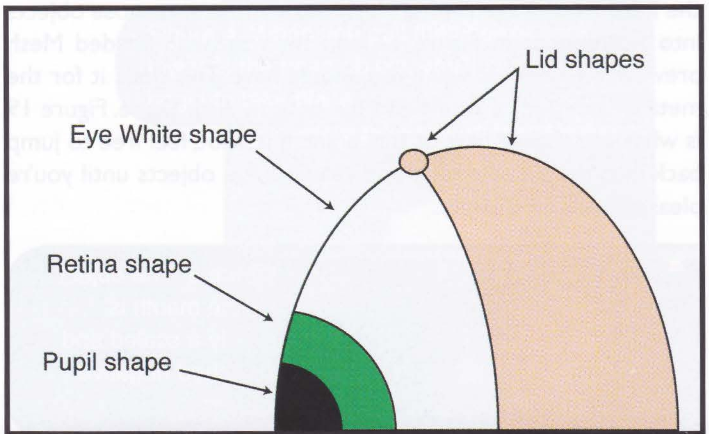


Figure 20. This is an illustration of the shapes used to create the eye object.

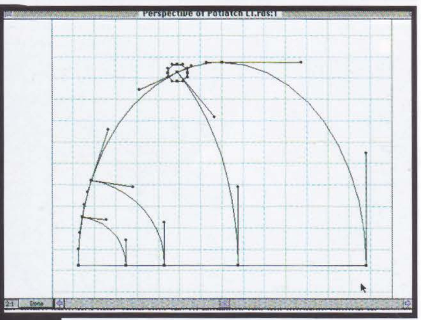


Figure 21. Creating all of the cross section shapes for the eye at the same time will help us align the separate eye objects later on. This also helps keep the geometry count to a minimum.

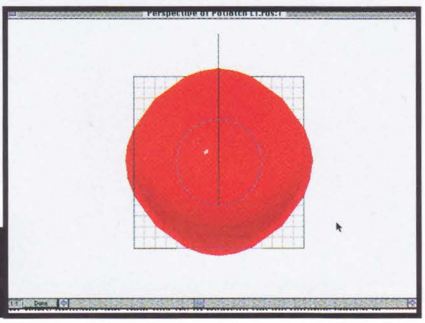


Figure 22. Our first attempt at the torus.

22. What we want to do now is make sure that the bottom edge of our cross section is exactly in the center of the torus. We do this by experimenting with the 'Distance to Axis' value in the torus dialogue box. First, let's zoom in on the center of the torused object while still viewing it from the left. As you can see in Figure 23, there is no hole in the center of the torus, so we can assume that the geometry is overlapping itself (This means that 8 inches is not enough to give us a clean torus.) Although it seems that 8 inches was the magical number and it's perfect, but if you switch to wireframe view, as in Figure 24, you can see that the geometry is, indeed, overlapping itself. You can try to eyeball this (pun slightly intended) and drag the cross-section up so that it spins around the axis at a greater distance (Though it's often better to just use trial and error by entering other values into the Distance to Axis dialogue box.) So choose Torus again from the Geometry>Extrusion Preset menu item and this time, let's put 10 into the Distance to Axis Box. If you switch back to the regular preview at this point, you'll see that this value is too large, and that there is too big of a hole in the middle, as shown in Figure 25. Zoom in on the hole and we'll adjust the torus one more time. The idea here is to get the hole in the center to disappear, while having as little overlapping geometry as possible (In fact, none if possible.) A very tiny hole will most-likely not show up in your render anyway, but overlapping geometry is likely to cause ugly distortions in the center of your torused model. Normally, this is trial and error. If you know that 8 is too small and 10 is too big, try 9. If 9 winds up showing a hole, you'll know it's too big as well, and you can work down from there. In my case, the magic number was 9.52. This number only works if your cross-section is exactly the same size as mine, so don't hold it too close to your heart. With my file, however, a value of 9.52 left a tiny hole right in the center. This hole is small enough that it'll never show up in a render, and we still have no overlapping geometry.

Once you get this perfect setting for the torus, you might notice that the hole in the middle of your object is star-shaped and that your torus is not very round. That's OK, we can fix this too. While still in the left view, zoom out just enough so that your torus path fills your screen. Turn off your preview by selecting No Preview from the View menu. This will leave you with nothing but a view of your torus path and the cross section. Select the cross-section and you'll notice that it's only comprised of four points. This is not enough information for RDS to create a perfectly round extrusion. To give RDS enough info, you need to add points to your torus path. To do this, select the Add Point tool and click in between each of the existing four points. Figure 26 shows what I mean. This doubles the number of points used to make the extrusion. If you zoom out a little and turn your preview back on, you'll see that the shape has already gotten rounder. Not round enough, perhaps, but we're making progress. To make the object even rounder, go back over the path with the 'add-point tool' and add points between all of the points currently on the path. If it's still not round enough, repeat the process one or two more times and you'll have a perfectly round torused object. See Figure 27 for an example. If your path becomes too cluttered with Bezier handles while you're adding new points (which it will,) simply choose the normal arrow tool, deselect the path and select it again. This will

Figure 23. As you can see, there is no hole in the middle of this torus.

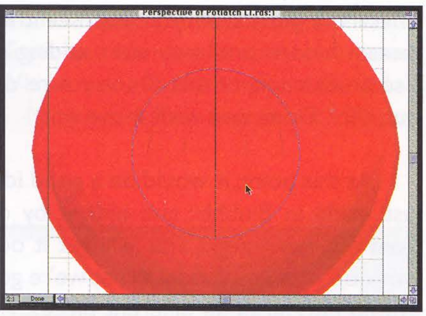


Figure 24. A view in Wireframe shows that we have overlapping geometry in the center of the torus. This is very bad as it can cause very funny-looking artifacts in your render.

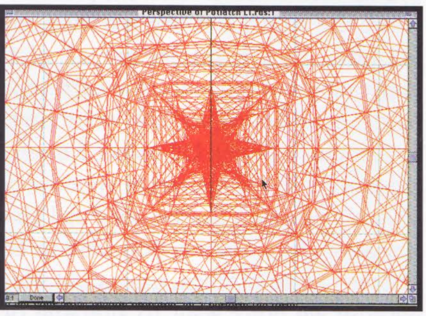


Figure 25. Changing the torus "Distance to Axis" setting leaves us with too much space.

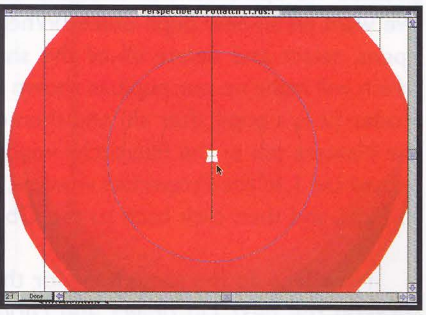


Figure 26. Now it's time to round out those flat edges of the torus by adding points to the extrusion path.

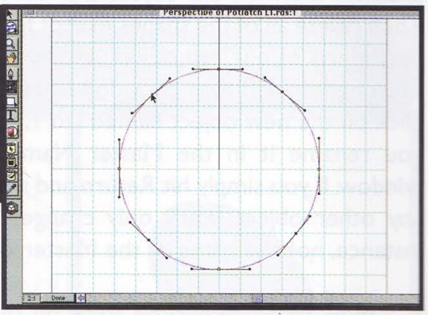


Figure 27. Several "Add Point" passes around the path yields a perfectly round torus.

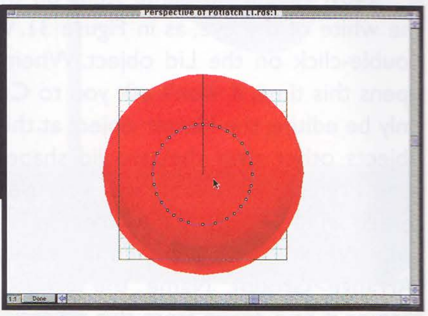
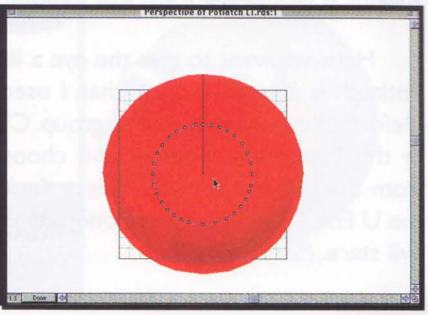


Figure 28. Deleting all of the shapes except for the one which will make our Pupil object, we wind up with a pupil that is perfectly aligned with the rest of the eye objects.



select the points so you can see them, but the handles will remain hidden until you start adding points again. Figure 27 is also an example of this. Once you're done smoothing this thing out, click Done and we'll move on.

At this point, it would be a good idea to select the head you just made in Blubble, and hide it by choosing Object Invisible from the View menu. This will get it out of your way while you work on your eye model. What we're going to do now is split the eye up into all of its different pieces. This is why we named the entire eye model, 'Lid.' We will wind up with a final Lid object, but for now, it's a container for all of the pieces. Let's start by duplicating the eye, once for each separate object we need. We have a pupil, an iris and the white part. We already have the Lid, so just duplicate the Lid object 3 times, so you wind up with four Lid objects. In the Hierarchy window, double-click on the last Lid object. This object will be our Pupil object. You will get a dialogue box asking you whether you want to Edit Master or Create New Master. In this instance, you would want to create a new master, because we don't want to alter the original Lid object just yet. We want an all-new pupil object. When the Free Form window opens, select and delete all of the shapes except for the one which will make up our pupil, as shown in Figure 28. Apply a black shader (it is a pupil after all) and then click Done. Now click on the Masters tab in the Hierarchy window and select the object named Lid 1. In the Properties window, change the Master Name to Pupil, and then click back to the Objects tab.

Now let's do the same thing for the Iris of the eye. Double-click on the next Lid object and choose Create New Master. Then delete all of the shapes except for the one which will make up the iris of our eye object, as shown in Figure 30. Shade the object green and then click done. Now go into the Masters tab, click on the new object named Lid 1, and rename it Iris. Be sure you rename it in the Master Name field of the Properties window. If you simply hit Return and name it as you would name any other object, you'll only change the name of the Object instance, not the name of the Master object.

Now repeat the same steps on the next Lid object to get the white of the eye, as in Figure 31. When you're done there, double-click on the Lid object. When the Free Form window opens this time, it won't ask you to Create New Master (you'll only be editing the Master object at this point.) Delete all of the objects other than the two lid shapes and shade with a skin tone. Preferably the same skin you used for the head. What you should wind up with is the object in Figure 32. Finally, select the Lid, White, Iris and Pupil objects and group them (Arrange>Group). Name the group, 'Whole Eye.' We'll be shaping it as a group from this point.

Here we want to give the eye a little of the meanness that Potlatch is famous for. For that, I used a Non Uniform Scaling Deformer on the Whole Eye group. Click on the Deformer tab in the Properties window and choose Non Uniform Scaling from the pull-down menu. Select the Y axis and enter 50% for the U End Scale. This tapers one side of the eye to give it a nice evil stare. (See Figure 33.)

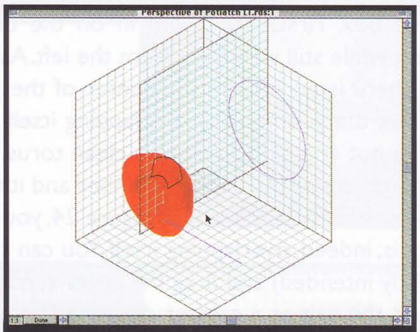


Figure 30. Creating the iris of the eye by deleting the extra shapes.

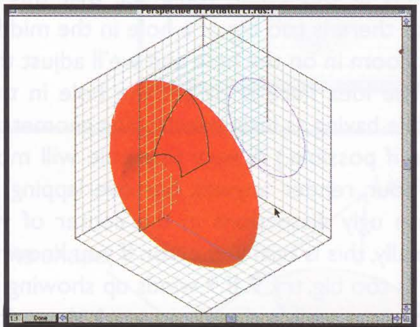


Figure 31. Creating the white of the eye.

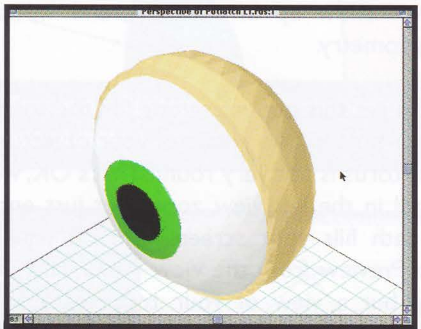


Figure 32. The final aligned eye objects.

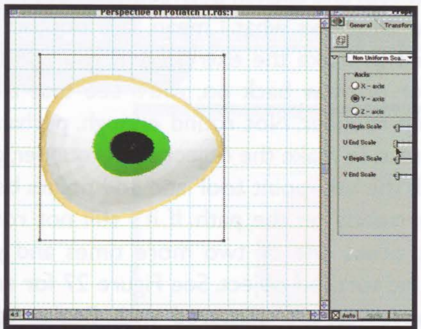


Figure 33. Tapering one end of the eye for an evil stare.

I'd like the eye to squint a little more and be able to open and shut in animation, so let's fix that real quick. Double-click on the Whole Eye group to jump into the group. When you get there, duplicate the Lid object. Now go to the Front view and, using the 2D rotate tool, rotate each lid, as shown in Figure 34. You don't have to be specific here, just rotate them a little. It should be noted here that the way I built my specific eye model, a simple rotate will not close the lid without cutting into the eyeball object. This is easy enough to fix in an animation by adjusting the position of the lid when rotating, but I thought I'd point it out in case you set yours up and it doesn't work right off the bat. You might also find it advantageous to readjust the Hot Points of the lid objects to determine their axis of rotation. When you're done, jump out of the group.

If your lid objects overlap, try rescaling the lower lid.

You may find that the geometry of the lower lid pokes through the geometry of the upper lid. If this happens, simply rescale the bottom lid slightly so that the upper lid covers the additional geometry.

Now that we have one eye set up, duplicate the Whole Eye group and, in the group's Deformers tab, reverse the U End and U Begin Scales so that the U Begin is 50% and the U End is 100%. This will reverse the taper of the duplicate Whole Eye group. Now you're free to position and scale the eye groups to get Figure 35.

The Teeth

Potlatch's teeth are made from a simple edited sphere shape and envelopes in the Free Form Modeler. Figure 36 shows the tooth in creation. Once you get the first tooth modeled, you can duplicate, resize and position them as you see fit.

The Hair

Since Potlatch is but a wee tyke, he hasn't had much time to grow a full head of hair, so the obligatory Charlie Brown curl seemed appropriate. This was created by extruding a circle shape along a spiral path in the Free Form modeler using the Spiral extrusion preset, and tapering the extrusion from 100% to 1%. Figure 37 shows the hair creation.

The Tongue

The final step in the creation of Potlatch's head is his tongue. This is most likely the simplest of all since it's just a resized sphere primitive with a spot procedural in the bump map. Figure 38 shows our tongue in full form.

Final

Put all of these objects together and Potlatch is ready to begin his crusade. Although I only covered the head in this tutorial, you can use all of the above techniques to create an equally disturbing body for the little tyke. Figure 39 is enough to scare off even the most ardent babysitter. In closing, the mapping for this final was done as follows: For the head, I applied a texture map in the Color and Bump channels using Spherical Mapping. The Pupils, Lids, Teeth and Hair use simple color-based shaders and the Iris and Whites use a texture map in the color channel with Projection Mapping. Until next time…Happy RayDreaming.

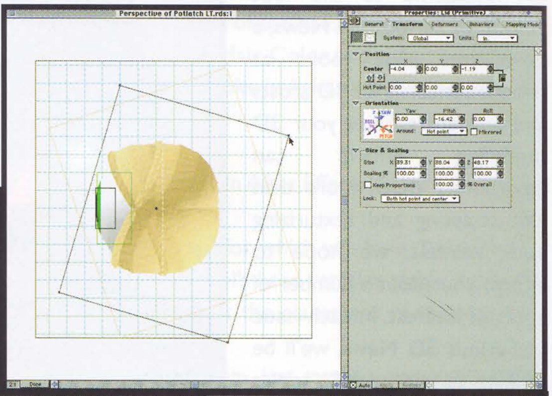


Figure 34. Rotate the lids slightly for a nice squint.

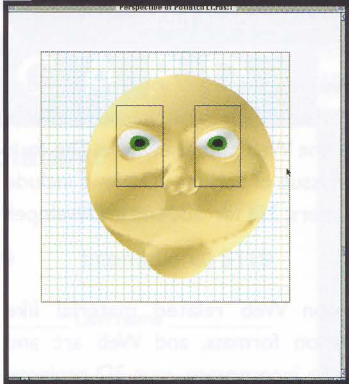


Figure 35. Potlatch is coming to life.

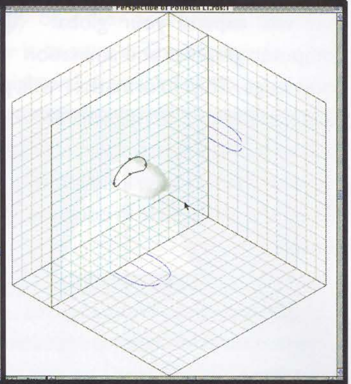


Figure 36. Geometry and modeling for the tooth object.

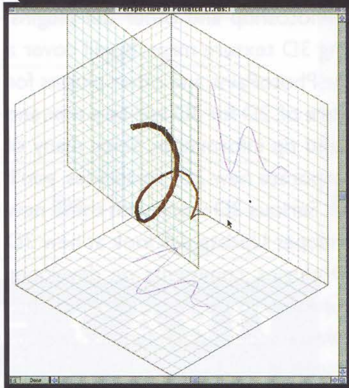


Figure 37. The hair object is a simple circle extruded along a spiral path using the Spiral Extrusion Preset found under the Geometry Menu.

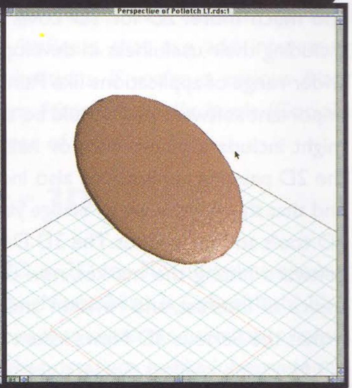


Figure 38. The tongue is a sphere primitive that has been resized.

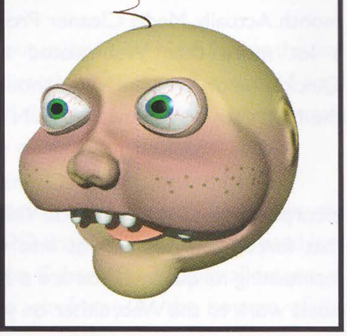
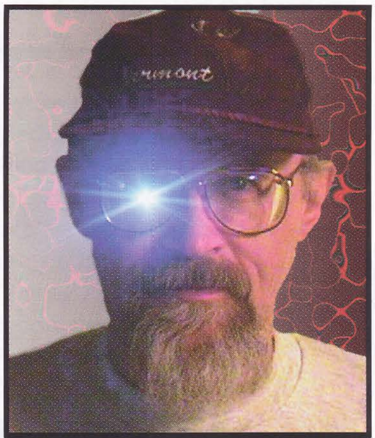


Figure 39. Add all these objects together and Potlatch is ready to roll.

Serious 3D News

Volume 1, Issue 2

By R. Shamms Mortier



Resistance is futile.

Welcome to the first edition of Serious 3D News, a newsletter that looks at related concerns for 3D artists and animators. Since your 3D modeling efforts can incorporate much more than just sculpting and texturizing your models, we hope to inform you about a number of areas of interest. In each issue of Serious 3D News, we'll be looking at four specific topics that will expand your global computer graphics and animation knowledge, This information will give you added resources to work faster and better. It will also allow you to expose your creative efforts to a wider appreciative audience, on the Web and elsewhere. The four named topic areas we'll target in each issue of Serious 3D News include 3D on the Web, Post Production Matters, 2D for 3D, and a Developer Update.

3D on the Web focuses upon Web related material like compression and bandwidth, animation formats, and Web art and animation software that you can use to incorporate your 3D projects. Post-Production Matters covers the major Post-Production applications and their plugins, like After Effects, Premier, Ulead's media Studio Pro, and much more. 2D for 3D covers Photoshop and other 2D plugins, including their usefulness in developing 3D texture maps. It will cover a wider range of applications like Painter, PhotoPaint, and other plugins for important software you should be aware of. 2D for 3D will be a mix, and might include a mini-review or hint and tip information. Since many of the 2D painting applications also incorporate new 3D capabilities, you'll find that there are ways to bridge your Serious 3D work with these new 2D tools and techniques. The 3D Developer Update will look at new 3D software hitting the market, new 3D plugins, comments on developer topics of interest, and revision and updates to be aware of. All of this makes the Serious 3D News insert a value added addendum for Serious 3D Magazine readers. So, let's get on with it...

3D on the Web

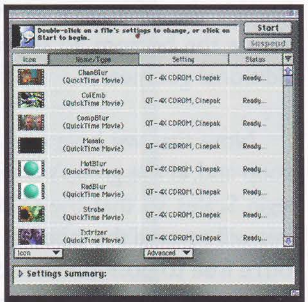
Media Cleaner Pro version 3 is our targeted Web product this month. Actually, Media Cleaner Pro (don't be put off by the name) does a lot more than Web-related actions, and nobody who creates QuickTime or AVI animations should be without it. It's available now for the Mac, with a Windows 95/98/NT version due at the end of 1998.

For Web use, Media Cleaner Pro version 3 shines with the incorporation of the Sorenson Video Codec, a compression algorithm that forces your animations into the smallest file size possible while maintaining its quality. If you are a 3D artist and animator who regularly posts work to the Web, either on your own page or another site, this is great news. It means that your audience will see the animation faster, and that they will be impressed by its quality.

The Sorenson Codec is QuickTime compatible, and since QuickTime is now a cross platform application, it means you have access to it along with all of the other fine features of Media Cleaner Pro 3.

As for MCP (Media Cleaner Pro) itself, I wouldn't think of saving any of my animation work without first running it through this application. An animation saved out at 20 MB regularly can be compressed to under 2 MB using MCP. And you can't tell the difference from the larger version.

New additions to version 3 abound. The most important is full QuickTime 3 support. You can also use MCP to compress still images, and it can also create animations from single frame sequences. MCP supports just about all of the Video, Audio, and Image formats you require. You can set the compression settings using the Advanced Settings interface, or you can select to use the MCP Wizard, which marches you through a list of options and sets compression from your responses. Either way, the result is high quality animations and images at greatly reduced file sizes.



Double-click on a file's settings to change, or click on Start to begin.

Icon	Name/Type	Setting	Status
	ChanBlur (QuickTime Movie)	QT - 4X CDROM, Cinepak	Ready...
	ColEmb (QuickTime Movie)	QT - 4X CDROM, Cinepak	Ready...
	CompBlur (QuickTime Movie)	QT - 4X CDROM, Cinepak	Ready...
	Mosaic (QuickTime Movie)	QT - 4X CDROM, Cinepak	Ready...
	MotBlur (QuickTime Movie)	QT - 4X CDROM, Cinepak	Ready...
	RadBlur (QuickTime Movie)	QT - 4X CDROM, Cinepak	Ready...
	Strobe (QuickTime Movie)	QT - 4X CDROM, Cinepak	Ready...
	Txtrizer (QuickTime Movie)	QT - 4X CDROM, Cinepak	Ready...

▷ Settings Summary:

The Media Cleaner Pro interface.

For more info on Media Cleaner Pro 3, visit Terran Interactive at http://www.terran.com In the next Issue, in the 3D On The Web section of the Serious 3D News, we'll look at DeBabelizer Pro 4.5.1

Post Production Matters

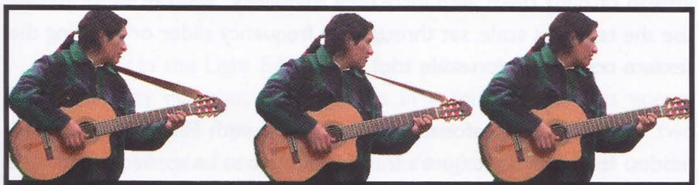
MetaCreations is folding the future development of Final Effects Complete for After Effects, due to a series of budget and personnel cutbacks. Final Effects Complete is the fat plugin package that combines MetaCreations previous two After Effects filter collections, Final Effects and Studio Effects. MetaCreations will still support, via technical assistance and technical help, owners of the present Final Effects Complete version. While you can still get hold of it, I would suggest that all serious After Effects users purchase the Final Effects Complete package. There are a couple of extremely valuable After Effects filters incorporated in Final Effects complete. Here are a couple of examples...

Do you need to remove wires or rods from your 3D footage in After Effects? Then perhaps the Final Effects Complete "Simple Wire Removal" filter will do the job. Major producers often need to use wire removal software to get rid of puppet rods or strings and cables used to support actors for special effects sequences. Even 3D artists and animators sometimes use a mix of computer graphics and puppet sequences in their productions. This filter may not do everything, but it is suitable for a variety of these tasks.

Simple Wire Removal works by assigning adjacent pixel data to the areas that need removal, making the wires and rods invisible. You set Point A at one end of the offending element, and Point B at the other, identifying it for removal. You then select from 4 Removal Styles: Fade (shows the background through), Frame Offset (brings in pixel data from a previous or subsequent frame within a range of -60 to +60 frames), Displace (replaces the selected wire with data from outside of the selected area), or Displace Horizontal (samples only the horizontal for replacement of the wire area). Odds are that one of these Removal Styles will do the trick for you. The Thickness (0 to 100 pixels) sets the area to be effected, while Slope controls the softness of the removal edge. When Slope increases, the edge becomes more abrupt. Solid color backdrops can use a higher Slope value, while complex backdrops will demand lower values and more blending.

Simple Wire Removal effect can be used to do any of the following:

- Use a stack of this effect to remove multiple wires and cables, or any selected anomalies.
- If you shoot a frame at the start of your footage that has only the background and not the wired or cabled image, you can use the Frame Offset type to select it as the replacement area. Later, during the post-edit, the frame with the replacement content can be deleted.



Left- Original footage showing the guitar strap. Center- Strap partially removed with a Thickness value of 12 and a Slope of 27.5. Right- Strap removed by increasing the Slope value to 65.

One more Final Effects Complete filter worth mentioning (there are dozens of filters in the complete set) is Hair. If your 3D models are standing in front of a stable camera that focuses on their head, then this filter can add some very magical elements to your 3D scene. It's a 2D effect, so it's only good for steady head-on footage, like the transformation of an actor into a werewolf. The effect can also be rather comical, depending upon how you set the parameters. The Hair filter allows you to grow hair on any selected area of the targeted footage. This is definitely one of the most unique effects offered by any After Effects plugin filter developer.

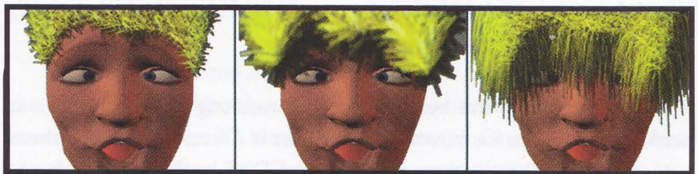
The Hair effect's parameters are adjusted by a number of controls. The Hairfall map allows you to select a layer in the stack to apply the Hair to. "Base Hairfall On" has a number of options. This tells the system what the Hair pattern should be based on, as far as Channel data. The default is Luminance, but you may also select any RGB Color Channel, Lightness, Hue, Saturation, or an Alpha Channel. Each option alters the look of the Hair pattern, so it's always best to explore each option before settling on one.

Then there's the Map Softness and Post-Noise controls. Increasing the Softness value (0 to 511) forces the Hair to fall more uniformly. Map Post-Noise (0 to 100) adds randomness as the value increases. For neater more symmetric Hair, set Softness high and Post-Noise low. Hair Length, Thickness, and Weight can also be controlled. Hair Length (0 to 500) sets the length. Values between 1 and 30 are usually enough, unless you want the entire footage to look overgrown (this is also a great filter for creating grass and other hair-like attributes). Thickness ranges from 0 to 4, with higher values beginning to look like feathers rather than hair. The Hair Weight (-100 to +100) tells the Hair which way to grow. Negative values grow upwards, and positive values force the Hair to obey gravity and fall downwards.

Spreading (-1,000 to +1,000), wrongly called "Extrude" in the FE documentation, sets the Z axis depth of the hair. Density (0 to 10,000) sets its XY parameter amount. The Hair Color and other parameters that determine the way the Hair looks in light and shadow are then determined.

How can you use the Hair filter in After Effects? Here are just two ideas:

- Grow Hair on any 3D model for which you have QuickTime or AVI footage. Make sure that the model's head remains stable during the animation. If not, you'll have to adjust the placement of the Hair on a frame by frame basis.
- Create a field of grass or grain. Just target a vertically resized color layer that sits on top of a sky or other appropriate backdrop. Create long strands (100) and allow it to vary in Thickness and Length values over time. Use a negative Weight value so it rises up.



These images are from a Poser 3 3D model animation, with the camera focused upon a close-up of the model's face. Left- Hair Length at 13, Weight at 0, Thickness of 1. Center- Length at 20, Thickness at 4, creates a feathers look. Right- A Weight of 1 forces the Hair to hang down.

In the next issue of Serious 3D News, we'll explore the Reel collection of nature footage from ArtBeats, that can add interesting composited effects to your 3D animations. If you're a serious After Effects user, keep an eye out for my After Effects f/x book (Coriolis Publishing), due out in the first quarter of 1999.

2D for 3D

This section might be called "3D in 2D for 3D" this time around, since it's about Knoll Software's CyberMesh. What is CyberMesh? It's a Photoshop plugin (Mac and Windows) that reads the Luminance values of a grayscale image and translates that data into height information. In so doing, it allows you to input a 2D grayscale picture and output a 3D DXF file. CyberMesh has been around for a while, but you may not know about it. It's one of those "insider" filters that maintains a long life unbeknownst to most users.

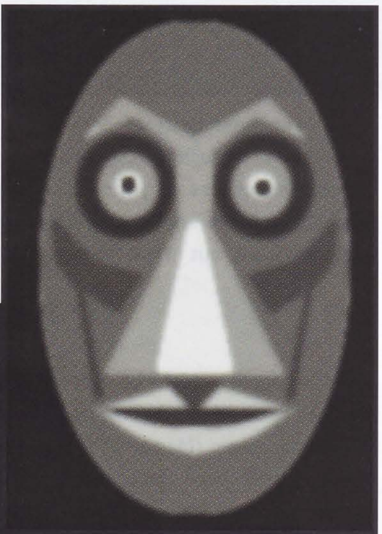
The first thing to remember about using CyberMesh is that the size of the DXF files it generates are directly related to the size of your imported 3D picture. The imported 2D graphics should be grayscale images at 72 DPI, and no more than about an inch or two across.

When imported into CyberMesh, which is activated from the Export command in Photoshop, the 2D image is instantly translated into a 3D wireframe proxy. The tools in the CyberMesh toolbar allow you to rotate, move, zoom, and render the wireframe. At the bottom of the

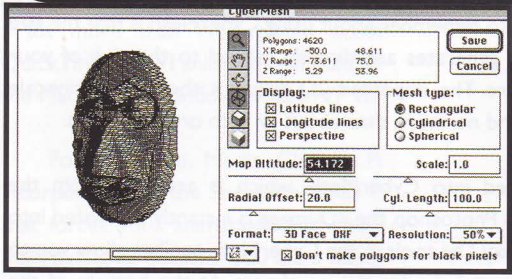
CyberMesh dialog is a pop-up list named Resolution. There are percentage values in this list that increase or decrease the polygons in the mesh. Selecting 100% for example will maximize the number of polygons, whose count can be seen at the top of the dialog. 3D DXFs with a high polygon count offer finer detail, and can be smoothed out better, but at a price of a larger file size. The idea is to reduce the polygon count a bit, but not to interfere too much with the quality of the 3D representation. Selecting a 75% resolution can be a happy medium, offering both a high enough count to represent the data well, while at the same time reducing the file size.

CyberMesh allows you to select what Mesh Type your data will be sculpted in: Rectangular, Cylindrical, or Spherical. Rectangular is the default, mapping the mesh to a rectangular plane. If the background is 100% black, you can elect to have it cut away. Selecting Cylindrical or Spherical allows the mesh to be wrapped around either of those two forms, creating a much more dimensional object. By toying with the Radial Offset control, you can decide how much of the cylinder or sphere is to be used. For a face, using just a partial cylinder or sphere can add just the touch of depth needed for a 3D object. You have to remember however that using either the cylinder or spherical mesh will also deform the object to some degree, stretching it out either laterally (cylinder) or overall (sphere).

I've found that the best use for the resulting DXF objects is as masks or mask-like items, when the subject is a face. You can use these objects in any 3D application that supports DXF imports, which means the majority of 3D applications around.



The starting graphic was drawn in Photoshop as a grayscale image. Note that it is symmetrical on the vertical axis, important when creating CyberMesh faces. We could have used a photo just as well, as long as the shadows were well defined and the face was vertically symmetrical.



Polygons: 4620
X Range: -50.0 48.611
Y Range: -73.611 75.0
Z Range: 5.29 53.96

Display:
☒ Latitude lines
☒ Longitude lines
☒ Perspective

Mesh type:
● Rectangular
○ Cylindrical
○ Spherical

Map Altitude: 54.172
Scale: 1.0
Radial Offset: 20.0
Cyl. Length: 100.0
Format: 3D Face DXF
Resolution: 50%
☒ Don't make polygons for black pixels

Here is the 2D graphic s it appears in CyberMesh. Here, we can play with the Mesh mapping and the polygon count before saving it as a DXF.

Developer Update

Finally, after months of waiting, MetaCreations Bryce 3D has been upgraded with an updated version. Bryce 3D is one of the most addictive 3D environments you will ever run across, and it has many thousands of rabid users as a result. There have been a number of necessary bug fixes in the new release, but more importantly, are the new attributes added. Here's what's new...

- A New Preview Mode: In most places that Nano-preview renders exist (Materials Lab, Materials Presets, etc.), you can choose to view the actual object, instead of the previous primitive stand-in. The new mode is called "Actual Selection". In this mode, even Booleans and triangle meshes are represented accurately. This is especially useful for applying textures in world space and getting true preview results in the Nano-render.

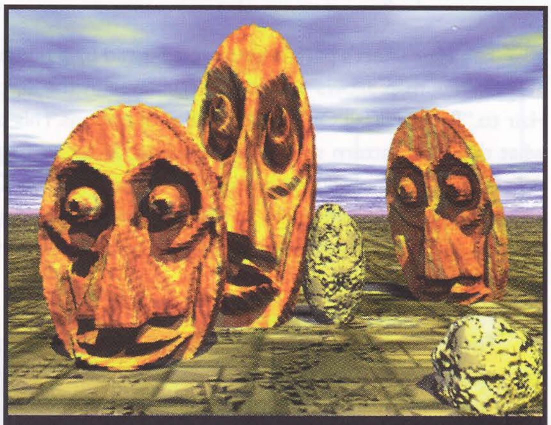
- Four New Material Mapping Modes: The mapping mode menu in the Materials Lab now contains a few new features:

- Scale Pict Size. When selected, it really scales PICT textures instead of tiling them with increasing frequency. Both of these modes use the texture's scale, set through the frequency slider or by using the texture transformation scale tool as input.

- Centered Transform. This only works with Parametric mapping modes. It forces the texture's transformations to be applied around the "center" of the object's surface.

- Decal Colors. A brand new mode, it blends a texture's color with the affected component's base color, using the texture's alpha channel to control the amount of blending. This can make complex decaling effects much easier to achieve.

- Alpha Scaling. Normally, if you drive a component's value with a texture, the texture's alpha channel will set the value without regard to the amount that was set using the component's slider. With alpha scaling turned on, the amount set with the slider will "scale" the amount provided by the texture's Alpha Channel. This gives you much



As a DXF, the new 3D object is seen here imported into Bryce 3D and cloned. A texture was applied (Sandstone), and the scene rendered.

more subtle control over the influence of the texture on the material component's value.

- Circular Object Path. At last! A real Circular Path, and not the warped ovals previously called circular. When an object is linked to a circular path it can travel all the way around the path without being bound by a start and end point.

- New I/O Plug-Ins. A few new plug-ins have been added. The 3D Studio loader is now available on the MAC side, and both platforms now have plug-ins for generating movies as a sequence of images. You get a BMP sequence for Wintel platforms, and a PICT sequence on the Mac.

- Override Drop to Boxes. A new item has been added to the wireframe resolution menu, "Auto LOD" (Level Of Detail). When checked, objects will automatically draw as boxes if it takes too long to draw the scene. If you uncheck this item, this behavior will stop.

- Group Origin Editing. Hooray! Group origin editing was prevented in the original release of Bryce 3D, but now it has been enabled. You can now freely edit (reposition) a group object's origin, just like any other object.

- New in the Light Editor. The light editor now lets you make a light's intensity negative, which results in a light that inhibits energy instead of adding it. If your scene looks great except for one or two bright spots, just place a darklight near the bright spots to even out the lighting. Light intensity values can now go much higher or lower to accompany lights which use the squared falloff option. Lights which are very far away can also benefit from extended intensities.

- New Terrain Editor Functions. A new fractal terrain algorithm written by Ken Musgrave has been added. New features have also been added to the "Canvas" or grayscale height painting section of the Terrain Editor to improve its speed.

- New Advanced Motion Lab Functions. Now, holding the space bar down while dragging in the timeline area pans through the timelines. The first VCR button from the left brings up the Animation Setup dialog, and the last VCR button from the left does a preview render.

- New Animation Playback & Work Area Key Commands. A number of new hot key functions have been implemented. Dragging on the end of the work area to set duration snaps to every frame, while holding the "Option/Alt" key while dragging causes it to not snap at all. Holding the "Shift" key while clicking on the "Next Keyframe" button will advance the Time Scrubber to the next frame.

- New Object Editing Key Commands. By holding down the "X", "Y" or "Z" keys, you can move and rotate objects along the selected world space axis. Holding the "Shift" key while clicking on the Origin Point of an object will reset the Origin Point to the default position. "Cmd/Ctrl" + "Shift while clicking on the Origin Point of an object will set the Origin Point to the center of all the object in the scene. Clicking then holding the space bar while positioning an object with its Origin Point showing will cause the Origin Point to stay in position while the object moves.

- New Key Commands in the Advanced Motion Lab. Cmd/Ctrl drag on a selected keyframe to copy and move it in time. Option/Alt drag on a keyframe, if more than two keyframes are selected, will uniformly scale the keyframes as the time increases or decreases. The "I" key with a position keyframe selected toggles between spline interpolation and linear interpolation. Pgup / PgDwn now moves you up / down through the timelines. Arrow up/down moves up / down through the timelines one at a time. Home/End moves to the first/last displayed timeline. Cmd/Ctrl "S" turns the selection filter On/Off. Cmd/Ctrl "H" turns the hierarchy filter On/Off. Cmd/Ctrl "Q" Collapses/Uncollapses the timelines for all objects. Cmd/Ctrl "E" Expands/Collapses the objects hierarchies. Cmd/Ctrl "Z" is Undo/Redo

Access the MetaCreations Web site at:
http://www.metacreations.com/support or e-mail to:
bryce@metacreations.com

MetaCreations telephone customer support hours are: Monday–Friday, 8:00 AM–5:00 PM Pacific Standard Time, excluding holidays. Call (408) 430-4063.

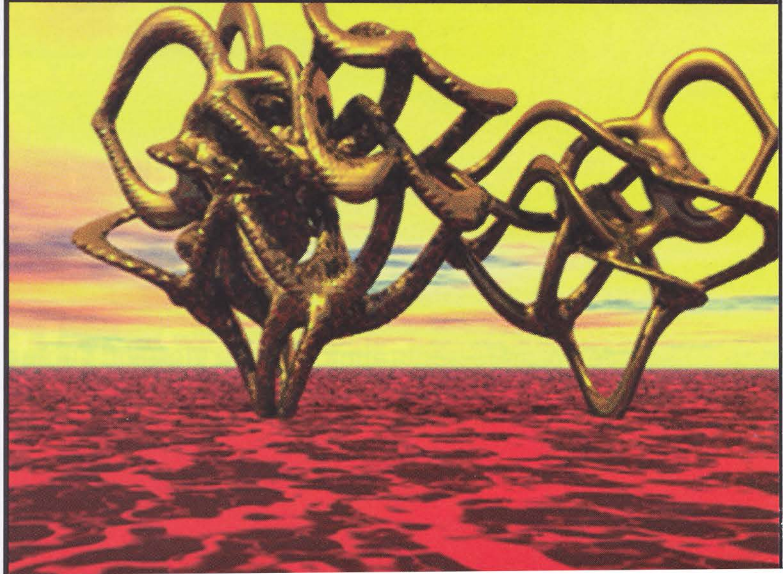
MetaCreations Corporation
6303 Carpinteria Avenue
Carpinteria, CA 93013
(805) 566-6200 phone
(805) 566-6385 fax

If you're interested in exploring the finer details of Bryce 3D, see the Bryce 3D Handbook, just out from Charles River Media. In future issues of the Serious 3D News, we'll look at the Cinema4D XL update, the daVinci 3D filter for 3D Studio Max, and a lot more. In the next issue, we'll explore MetaCreations Poser 3.

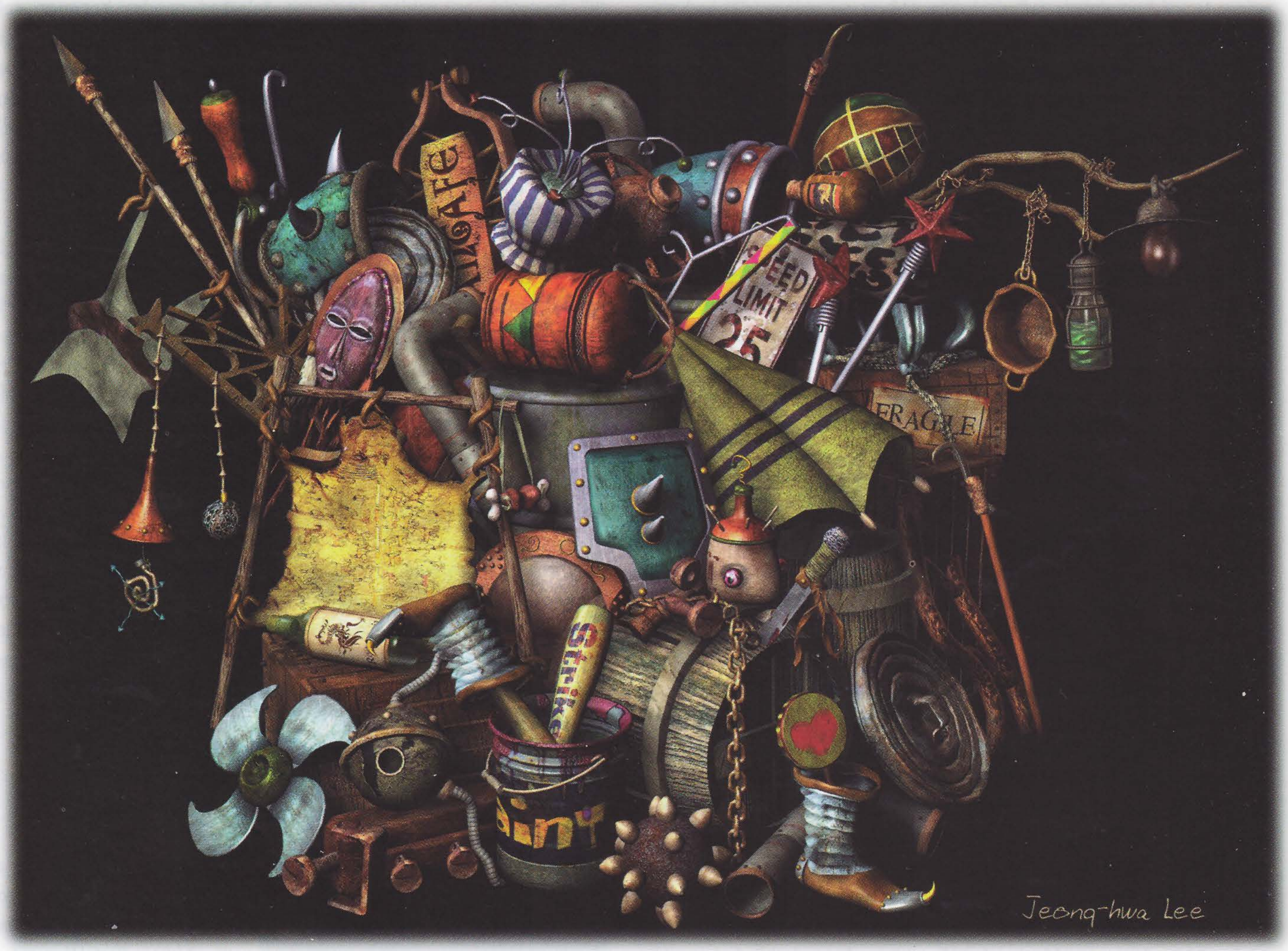
Write to me at the following e-mail address if you like:
rshamms@together.net, or in care of Serious 3D Magazine
Comments and questions are welcome —

R. Shamms Mortier has written 9 books on computer graphics and animation, with more coming in 1999, and over 700 illustrated articles for national and international publications, including Serious 3D. He is the head of Eyeful Tower Communications, a design and computer animation studio in Bristol, Vermont.

These twisted objects were designed in Impulse's Organica and ported to Bryce 3D for animation rendering, where infinite ground and sky planes are available.



Jeong-hwa Lee Won a $5,000 ALPHA Computer in the Great Goblin Heap Contest! Now it's Your Turn!



Serious 3D Magazine and Carrera Computers congratulate Jeong-hwa Lee, the winner of our first 3D Image contest! Her extraordinary winning image is featured above.

It's your turn to win an ALPHA 533 MHZ computer from Carrera Computers!

Our current contest is "Goblin Christmas." That's right, give us your concept of a Goblin Christmas, including Grumpy Claus' sleigh, pulled by eight... well, eight something. You decide. We don't care if they're Reindeer, Rats, Ants or Living Sticks. The setting is also up to you. It can be a Goblin village, the Disenchanted Forest, the Ugly Tract, or any other place in the Goblin World you'd like. And you don't have to include goblins if you don't feel like it. It just has to raise Good Goblin Cheer in the judges hearts. Good luck!

To learn more about the contest, rules and submission guidelines, visit our website...

www.serious3d.com

The Impossible Made Possible

DIGITAL DOMAIN

Scott Ross, CEO and President of Digital Domain said, "With Titanic, we undertook one of the most ambitious and complex projects in film history. We needed a partner who could quickly assemble a solution specific to our application needs, and handle our cross-platform and networking issues. Because of their attentive follow-through, we actually consider Carrera to be more of a broadcast company than a hardware company. They worked 'round the clock' to make the impossible possible. The results speak for themselves."

Carrera

1-800-576-RISC

www.carrera.com

The Power Behind the Scenes

Carrera uses the 21164 Family of Alpha Microprocessors. The fastest processor in the world.*

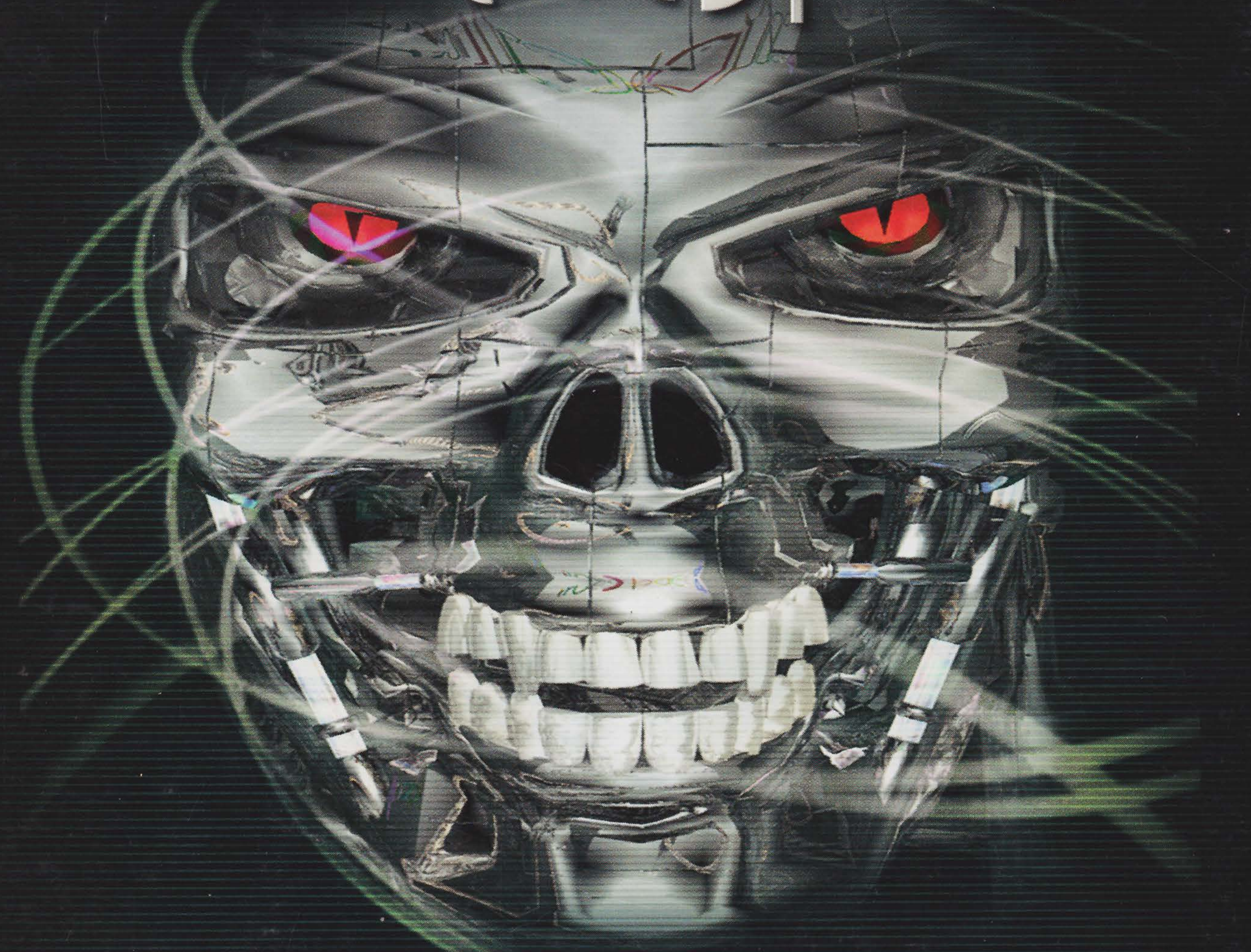
AlphaPowered™

AlphaPowered and logo are trademarks of Digital Equipment Corporation. All images used with permission. ©1998 Carrera Computers, Inc.

1.800.351.7620 www.caligari.com/serious

See the difference for yourself

trueSpace™4



True 3D interface • Game quality acceleration • Inverse kinematics • Forward dynamics • Prototyping with scripts • Precise collision • NURBS • Bones • Atmospheric rendering • Reflectance shaders • Hybrid radiosity

$595

30-DAY MONEY BACK GUARANTEE

CALIGARI CORPORATION • 1959 Landings Drive, Mountain View, CA 94043 • tel 650.390.9600 • fax 650.390.9755

Copyright © 1998 Caligari Corporation. All rights reserved. Caligari & trueSpace are trademarks of Caligari Corporation. Cybernetic Assasin by Paul Safr.

PRINTED IN CANADA